

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.



United States
Department of
Agriculture

Center for Nutrition
Policy and Promotion

CNPP-13

aTX360
.U6L68
2003

The Low-Cost, Moderate-Cost, and Liberal Food Plans

2003 Administrative Report



Andrea Carlson, Mark Lino, Shirley A. Gerrior, & P. Peter Basiotis. (2003). *The Low-Cost, Moderate-Cost, and Liberal Food Plans: 2003 Administrative Report*. Center for Nutrition Policy and Promotion, U.S. Department of Agriculture. CNPP-13.

Editor: Julia M. Dinkins

Abstract

The Low-Cost, Moderate-Cost, and Liberal Food Plans, three fundamental parts of the U.S. food guidance system, are now revised. The plans provide representative healthful market baskets at three different cost levels. This revision of the plans incorporates recent developments in nutrition standards and dietary guidance as well as updates reflective of food consumption and nutrient content of foods. This revision also maintains a constant real cost for each plan.

Acknowledgments

The Center for Nutrition Policy and Promotion wishes to thank staff at the Office of Analysis, Nutrition and Evaluation, Food and Nutrition Service, USDA and the Food and Rural Economics Division, Economic Research Service, USDA for their helpful comments and review of this report.

March 2003

The U.S. Department of Agriculture (USDA) prohibits discrimination in its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410, or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

The Low-Cost, Moderate-Cost, and Liberal Food Plans

2003 Administrative Report

**Andrea Carlson, PhD
Mark Lino, PhD
Shirley A. Gerrior, PhD
P. Peter Basiotis, PhD**

**Center for Nutrition Policy and Promotion
U.S. Department of Agriculture**

**CNPP-13
March 2003**





Contents

	<i>Page</i>
<i>Executive Summary</i>	<i>ES-1</i>
<i>The Low-Cost, Moderate-Cost, and Liberal Food Plans: 2003 Administrative Report</i>	<i>1</i>
<i>Introduction</i>	<i>1</i>
<i>Background of the Food Plans</i>	<i>2</i>
<i>Data and Methods</i>	<i>3</i>
<i>Data</i>	<i>3</i>
<i>1989-91 Continuing Survey of Food Intakes by Individuals</i>	<i>3</i>
<i>Food Price Database</i>	<i>3</i>
<i>Methods</i>	<i>5</i>
<i>Model Inputs</i>	<i>6</i>
<i>Model Constraints</i>	<i>11</i>
<i>Mathematical Model</i>	<i>16</i>
<i>Market Baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans</i>	<i>18</i>
<i>Average Market Basket for Each Food Plan</i>	<i>19</i>
<i>Average Food Plan Market Baskets vs. Average Consumption and Previous Market Baskets</i>	<i>27</i>
<i>New and Previous Food Plans and Dietary Guidance</i>	<i>29</i>
<i>Cost Update of the Low-Cost, Moderate-Cost, and Liberal Food Plans</i>	<i>31</i>
<i>Conclusions</i>	<i>31</i>
<i>References</i>	<i>32</i>
<i>Appendix 1: Reprint—A Methodology to Price Foods Consumed: Development of a Food Price Database</i>	<i>A1-1</i>
<i>Appendix 2: Documentation of the Food Group Database</i>	<i>A2-1</i>



EXECUTIVE SUMMARY

The U.S. Department of Agriculture (USDA), Center for Nutrition Policy and Promotion (CNPP), with assistance from the USDA Economic Research Service and the USDA Food and Nutrition Service, has revised the market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans. These revisions reflect current dietary recommendations, food consumption patterns, food composition data, food prices, and the cost levels of the previous plans.

The USDA's Low-Cost, Moderate-Cost, Liberal, and Thrifty Food Plans are maintained by CNPP. The value of the Thrifty Food Plan serves as the basis for food stamp allotments (U.S. Department of Agriculture [USDA], 1999). The Low-Cost, Moderate-Cost, and Liberal Food Plans are used for various purposes: Bankruptcy courts often use the value of the Low-Cost Food Plan to determine the portion of a bankruptee's income to allocate to necessary food expenses. The Department of Defense uses the value of the Moderate-Cost and Liberal Food Plans to set the Basic Allowance for Subsistence rate for all enlistees, while many divorce courts use the value of the USDA food plans to set alimony payments. All three of the plans are used in USDA's report *Expenditures on Children by Families*, which is used to set State child support guidelines and foster care payments.

The market baskets of the three food plans reported here specify the type and quantity of foods that people could consume at home to have a nutritious diet at various cost levels. And these food plans each have 12 market baskets—one for each of these 12 age-gender groups: *Children* ages 1, 2, 3-5, 6-8, and 9-11; *Females* ages 12-19, 20-50, and 51 and older; and *Males* ages 12-14, 15-19, 20-50, and 51 and older.

Development of the Food Plans

Data and Methods

CNPP used two main data sources to revise the market baskets of the food plans: USDA's 1989-91 Continuing Survey of Food Intakes by Individuals (CSFII) and the Food Price Database that was created by CNPP by merging foods from the CSFII with data on national food prices. The CSFII, administered to a nationally representative sample of households in the 48 coterminous States, assesses the food and nutrient intake by individuals both at home and away from home. One-day food intakes by 9,961 individuals ages 1 and over were used for this revision. In the 1989-91 CSFII, people were asked what foods they consumed in a day, at home as well as away from home. Information on the ingredients, nutrient content, and amount consumed of each of these foods is contained in the data set. CNPP placed the 4,800 different foods consumed into 44 food categories, used CSFII sampling weights that make the data representative of the U.S. population, and weighted all the data in this study.

The CSFII does not contain information on food prices or expenditures for foods consumed, information needed to assign a price to a market basket. Thus, CNPP developed a method to estimate the price of foods as consumed in the survey and created the Food Price Database. To do so, CNPP used information about national average food prices from several sources: the Scantrack system developed by A.C. Nielsen; the retail prices database from the Bureau of Labor Statistics, U.S. Department of Labor; wholesale prices for fresh produce from the Agricultural Marketing Service, USDA; and fish prices from the National Marine Fisheries Service, U.S. Department of Commerce. Because the USDA food plans provide the cost of eating at home, for purposes of calculating the cost, CNPP assumed that all the foods that people said they ate were prepared at home.

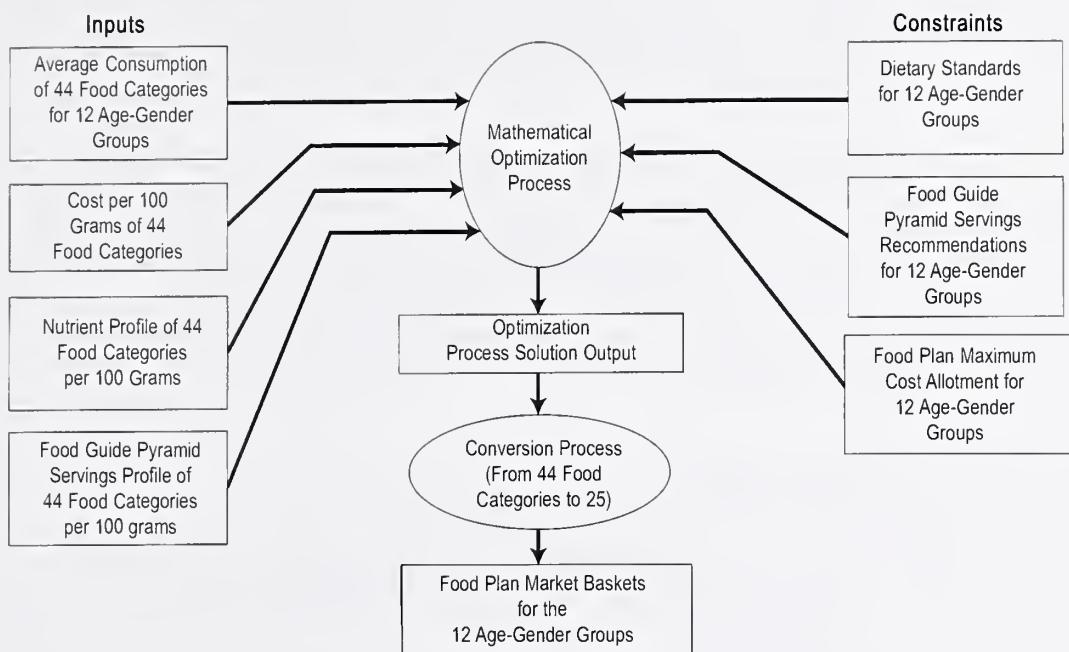
To calculate a market basket of each food plan for each of the 12 age-gender groups, CNPP used mathematical optimization models that minimize deviations from average consumption patterns for the 44 food categories and suggest new consumption patterns that meet required dietary standards and maintain constant cost levels. Each model consists of 4 sets of inputs and is subject to 3 constraints (fig. ES-1). The inputs relate to each of the 44 food categories and include average consumption, a price for each food category, a nutrient profile, and the servings profile of the *Food Guide Pyramid*. The constraints in each model are dietary standards—including serving specifications of the *Food Guide Pyramid*—and cost of the Low-Cost, Moderate-Cost, and Liberal Food Plans. (The costs are those for 1989-91 that correspond to the period when the food consumption data were calculated.) Thirty-six models were estimated: one for each of the three food plans for each of the 12 age-gender groups.

The Low-Cost, Moderate-Cost, and Liberal Food Plans have historically reflected, in quartiles of food spending, consumption patterns and eating habits. The value of the Low-Cost Plan corresponds to food consumption at the second quartile (25th to 50th percentile) of food expenditure; the value of the Moderate-Cost Plan, the third quartile (50th to 75th percentile) of food expenditure; and the value of the Liberal Plan, the upper quartile (75th to 100th percentile) of food expenditure. To create acceptable market baskets, the optimization model minimizes deviations from the food consumption habits of each age-gender group within each expenditure quartile. That is: the final market baskets are as close as possible to the original consumption habits, while still meeting nutrition and cost constraints.

Dietary Standards

The revised market baskets of the food plans incorporate updated knowledge of nutritional needs. Forming the basis of the market baskets are the 1989 Recommended Dietary Allowances (RDAs), the 1995 *Dietary Guidelines for Americans*, the National Research Council's *Diet and Health Report*, and the serving recommendations of the *Food Guide Pyramid*. The market basket for

Figure ES-1. Food Plan Methods



each age-gender group meets 100 percent or more of the group's RDAs for 15 essential nutrients—protein, vitamin A, vitamin E, vitamin C, thiamin, riboflavin, niacin, vitamin B₆, folate, vitamin B₁₂, calcium, phosphorus, magnesium, iron, and zinc. Recommendations for sodium and dietary fiber were also used in the revised food plans. The RDA levels for each of these nutrients represent an amount sufficient to meet the needs of practically all healthy people in the group. Although the 2000 *Dietary Guidelines for Americans* and the Dietary Reference Intakes (DRIs) for macronutrients, vitamins, and minerals are now available, they were not finalized when USDA revised the Thrifty Food Plan. CNPP chose, therefore, to make the revisions of the Low-Cost, Moderate-Cost, and Liberal Food Plans consistent with those of the Thrifty Food Plan.

Recommendations for fat and saturated fat consumption for the revised market baskets were based on the 1995 *Dietary Guidelines for Americans*, which indicated that adults and children ages 5 and older consume no more than 30 percent of total food energy (calories) per day from total fat and less than 10 percent of calories per day from saturated fat. For children ages 2 to 5, the *Dietary Guidelines* recommended gradually reducing intake of total and saturated fat to no more than 30 percent (total fat) and less than 10 percent (saturated fat) of total calories per day by the time the child is about 5 years old. Although issued after this project was undertaken, the 2000 Guidelines are similar to those

of 1995. Recommendations for cholesterol and carbohydrate were based on the National Research Council's *Diet and Health Report*, which recommends that people, ages 2 and over, limit their daily intake of cholesterol to 300 milligrams or less and that all people consume 55 percent or more of calories per day from carbohydrate.

This revision of the market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans is the first one to impose serving recommendations of the *Food Guide Pyramid* and parallels the revision of the market baskets of the Thrifty Food Plan. The Pyramid is important to this revision because it specifies the number of servings of the five major food groups (grains, vegetables, fruits, milk products, and meat/meat alternates) that people of different age-gender groups need to eat to have a healthful diet.

Cost Level

Cost was a primary constraint that needed to be met by the new market baskets; that is, none could cost more than the previous baskets. Accordingly, because 1989-91 consumption data underlie this revision, CNPP constrained the cost of each age-gender group's revised market basket to equal the average cost of its previous market basket in 1991 dollars. Thus the real value (cost) of the food plans was constant across the years. The cost of the market baskets is updated monthly by using the Consumer Price Index (CPI) for various food items.

CNPP considered other food-cost options. The costs of the previous Low-Cost, Moderate-Cost, and Liberal Food Plans were set at the midpoint of the respective 1977-78 quartiles of food spending for each age-gender group (USDA, 1983c). For example, the cost of the Low-Cost Plan for a male age 20-50 was set at the 37.5-percent level on the distribution of food spending (the midpoint of the 25th to 50th quartile) for a male in this age group. CNPP updated these costs with the CPI for various food items and examined the distribution of the estimated cost of food that people reported eating. The midpoints of the quartiles of this distribution of estimated food costs were similar to the published costs of the Low-Cost and Moderate-Cost Plans; the midpoints were higher for the Liberal Plan.

Results

The optimization model yielded a market basket—consisting of quantities of each of the 44 food categories—of the Low-Cost, Moderate-Cost, and Liberal Food Plans for each of the 12 age-gender groups. Each market basket met constraints for dietary standards, serving recommendations of the *Food Guide Pyramid*, and cost levels.

In the design of the three food plans, CNPP converted foods and quantities consumed into the appropriate corresponding form and quantity of purchasable foods. After obtaining quantities of food as consumed in the 44 food categories from the model output, CNPP converted the quantities to the equivalent amount of food ingredients that could be purchased and then collapsed them into a simplified group of 25 food categories. One of the simplifications consisted of disaggregating mixed foods into ingredients and allocating them to these 25 categories.

For each of the food plans, a 1-week market basket of 25 food categories (in pounds) was determined for each of the 12 age-gender groups (tables ES-1a, 1b, and 1c). These individual market baskets may be combined to form a household market basket.

Conclusions

The revised market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans successfully incorporate recent dietary guidance and nutrient recommendations while keeping real-cost levels constant. The market baskets serve as a valuable framework for providing advice to households regarding nutritious food selection at various cost levels. Because most people have a diet that needs improvement, this revision of the market baskets is an important means of helping households eat more healthfully.

Table ES-1a. Market baskets of the Low-Cost Food Plan, pounds of food per week,¹ by age-gender group

Food category	Children (years)			Females			Males			Females			Males			Females			
	1	2	3-5	6-8	9-11	12-19	12-14	15-19	20-50	20-50	51+	51+	51+	51+	51+	51+	51+	51+	
<i>Pounds per week</i>																			
Grains																			
Breads, yeast and quick	0.26	0.48	0.86	1.27	1.28		1.44	1.17	2.16	1.33	1.21	1.22	1.20						
Breakfast cereals, cooked and ready to eat	0.45	0.46	0.63	0.46	0.66		0.40	1.44	0.30	0.35	0.16	0.52	0.80						
Rice and pasta	0.25	0.16	0.33	1.05	0.88		1.37	1.20	0.56	1.15	2.74	0.50	0.97						
Flours	0.15	0.22	0.31	0.33	0.56		0.53	0.49	1.09	0.48	0.45	0.46	0.48						
Grain-based snacks and cookies	0.06	0.09	0.25	0.18	0.27		0.09	0.19	0.21	0.21	0.14	0.15	0.15						
Total Grains	1.17	1.40	2.37	3.29	3.65		3.83	4.49	4.32	3.51	4.71	2.85	3.59						
Vegetables																			
Potato products	1.33	1.26	1.52	2.91	2.67		2.50	1.42	6.18	1.54	4.09	1.05	1.55						
Dark-green and deep-yellow vegetables	0.79	0.49	0.28	0.30	0.77		1.26	0.76	0.16	0.48	0.33	0.80	0.77						
Other vegetables	0.47	0.97	0.92	1.75	2.06		1.96	3.37	1.69	3.34	2.69	3.17	3.43						
Total Vegetables	2.59	2.72	2.72	4.96	5.50		5.71	5.54	8.03	5.36	7.12	5.01	5.75						
Fruits																			
Citrus fruits, melons, berries, and juices	0.16	0.16	0.47	0.99	1.50		1.08	2.60	3.95	2.05	4.46	1.75	2.72						
Noncitrus fruits and juices	1.62	1.68	1.44	2.04	2.42		0.83	2.30	0.95	1.88	1.14	2.63	2.85						
Total Fruits	1.78	1.84	1.91	3.03	3.92		1.91	4.89	4.90	3.92	5.60	4.38	5.56						
Milk products																			
Whole milk, yogurt, and cream	7.83	6.81	2.38	1.78	1.96		1.57	1.44	1.75	1.27	1.79	1.10	1.35						
Lower fat and skim milk and lowfat yogurt	0.00	0.00	3.99	4.32	4.64		8.15	8.16	9.03	5.05	4.35	5.30	4.98						
Cheese	0.17	0.26	0.31	0.24	0.29		0.37	0.29	0.34	0.29	0.34	0.23	0.29						
Milk drinks and milk desserts	0.18	0.25	0.52	0.58	0.36		0.26	0.87	0.29	0.23	0.37	0.33	0.35						
Total Milk products	8.18	7.32	7.20	6.91	7.25		10.34	10.75	11.40	6.84	6.85	6.96	6.97						
Meat/meat alternates																			
Beef, pork, veal, lamb, and game	1.19	1.02	0.69	1.30	1.95		1.29	1.17	1.50	1.39	1.91	1.24	1.66						
Chicken, turkey, and game birds	0.59	0.40	0.60	1.17	1.19		1.85	2.54	1.00	1.84	1.50	1.79	1.98						
Fish and fish products	0.03	0.32	0.09	0.30	0.17		0.66	0.62	0.90	0.61	0.39	0.62	0.47						
Bacon, sausages, and luncheon meats	0.12	0.21	0.35	0.15	0.24		0.28	0.49	0.31	0.24	0.42	0.27	0.38						
Eggs and egg mixtures	0.18	0.11	0.35	0.40	0.55		0.47	0.33	0.52	0.49	0.36	0.30	0.50						
Dry beans, lentils, peas, and nuts	0.15	0.22	0.67	0.27	0.28		0.20	0.26	1.03	0.31	0.76	0.35	0.48						
Total Meat/meat alternates	2.26	2.28	2.75	3.60	4.38		4.75	5.41	5.25	4.87	5.34	5.47							
Other foods																			
Table fats, oils, and salad dressings	0.12	0.17	0.20	0.27	0.30		0.31	0.38	0.49	0.38	0.53	0.37	0.42						
Gravies, sauces, condiments, spices, and salt	0.11	0.07	0.12	0.16	0.16		0.11	0.25	0.23	0.22	0.33	0.21	0.23						
Coffee and tea	0.00	0.00	0.00	0.01	0.01		0.01	0.00	0.03	0.36	0.15	0.31	0.25						
Fruit drinks, soft drinks, and ades	1.60	3.02	3.64	3.87	4.87		5.07	5.02	6.02	6.65	4.84	4.04	2.85						
Sugars, sweets, and candies	0.37	0.22	0.53	0.33	0.55		0.28	0.36	0.37	0.39	0.32	0.45	0.42						
Total Other foods	2.18	3.48	4.49	4.64	5.89		5.78	6.01	7.13	8.00	6.17	5.38	4.17						

¹Food as purchased includes uncooked grain products; raw, canned, and frozen vegetables; dry beans and legumes; fruit juice concentrates; fruit with bones; meat with bones; coffee and tea are in dried weight. Also, while fruit drinks, soft drinks, and ades may appear to be large in quantity for some adults, they typically translate to less than one 16-oz bottle of such drinks per day.

Table ES-1b. Market baskets of the Moderate-Cost Food Plan, pounds of food per week,¹ by age-gender group

Food category	Children (years)				Females				Males			
	1 2	3-5	6-8	9-11	12-19	20-50	15-19	20-50	51+	51+	Females	Males
<i>Pounds per week</i>												
Grains												
Breads, yeast and quick	0.60	0.33	0.79	1.21	1.66	2.04	1.77	2.90	1.79	1.47	1.10	1.11
Breakfast cereals, cooked and ready to eat	0.70	0.72	0.76	0.54	0.33	0.36	0.70	0.35	0.28	0.26	0.47	0.72
Rice and pasta	0.24	0.15	0.54	1.24	1.00	1.03	0.46	1.00	0.94	2.64	0.74	1.41
Flours	0.12	0.07	0.21	0.52	0.58	0.52	1.09	0.59	0.59	0.57	0.46	0.54
Grain-based snacks and cookies	0.13	0.12	0.24	0.28	0.27	0.18	0.30	0.15	0.24	0.26	0.14	0.21
Total Grains	1.79	1.38	2.55	3.78	3.83	4.13	4.31	5.00	3.84	5.20	2.91	3.99
Vegetables												
Potato products	1.73	0.67	1.20	0.98	1.12	2.90	2.74	4.71	1.89	3.94	1.17	1.62
Dark-green and deep-yellow vegetables	0.44	0.79	0.25	1.29	1.40	0.60	0.22	0.47	0.70	0.56	1.04	1.05
Other vegetables	1.28	1.51	1.65	3.05	3.50	2.42	3.51	2.13	3.58	3.47	3.69	3.78
Total Vegetables	3.46	2.98	3.10	5.32	6.02	5.92	6.47	7.31	6.17	7.96	5.90	6.45
Fruits												
Citrus fruits, melons, berries, and juices	0.32	0.83	0.62	0.75	1.21	2.35	3.43	2.84	2.15	4.49	2.44	2.55
Noncitrus fruits and juices	1.72	2.65	1.81	3.24	2.38	1.29	1.44	1.44	2.86	1.82	3.16	3.44
Total Fruits	2.05	3.48	2.43	3.98	3.59	3.63	4.88	4.28	5.00	6.31	5.60	5.99
Milk products												
Whole milk, yogurt, and cream	8.07	8.09	3.57	1.70	2.04	1.58	2.26	2.20	1.31	1.74	1.19	1.52
Lower fat and skim milk and lowfat yogurt	0.00	0.00	3.37	5.10	5.31	9.79	8.95	9.06	5.32	4.57	5.68	5.12
Cheese	0.19	0.11	0.25	0.25	0.26	0.23	0.21	0.32	0.39	0.48	0.28	0.29
Milk drinks and milk desserts	0.25	0.30	0.72	0.77	0.49	0.34	0.46	0.55	0.32	0.41	0.34	0.29
Total Milk products	8.51	8.49	7.92	7.81	8.11	11.93	11.88	12.14	7.33	7.19	7.48	7.23
Meat/meat alternates												
Beef, pork, veal, lamb, and game	0.67	0.48	1.05	0.94	1.52	1.50	1.61	2.24	1.59	2.04	1.49	2.18
Chicken, turkey, and game birds	0.43	1.03	1.39	2.33	1.16	2.72	2.82	1.87	2.06	2.01	2.41	1.97
Fish and fish products	0.06	0.00	0.10	0.95	1.21	0.16	0.24	0.32	1.07	1.07	0.72	0.54
Bacon, sausages, and luncheon meats	0.47	0.57	0.29	0.30	0.30	0.43	0.32	0.51	0.19	0.50	0.20	0.33
Eggs and egg mixtures	0.79	0.84	0.25	0.37	0.47	0.59	0.24	0.26	0.53	0.27	0.40	0.45
Dry beans, lentils, peas, nuts	0.09	0.40	0.28	0.20	0.29	0.27	0.34	1.06	0.23	0.76	0.30	0.58
Total Meat/meat alternates	2.52	3.33	3.38	5.09	4.95	5.67	5.58	6.27	5.68	6.65	5.52	6.07
Other foods												
Table fats, oils and salad dressings	0.16	0.09	0.19	0.32	0.34	0.30	0.33	0.40	0.49	0.63	0.42	0.43
Gravies, sauces, condiments, spices, and salt	0.06	0.07	0.13	0.16	0.21	0.18	0.25	0.24	0.23	0.39	0.28	0.36
Coffee and tea	0.00	0.00	0.02	0.01	0.05	0.03	0.01	0.01	0.20	0.17	0.32	0.30
Fruit drinks, soft drinks, and ades	1.95	2.23	3.30	4.18	4.73	6.23	7.02	10.62	8.17	7.87	3.00	4.54
Sugars, sweets, and candies	0.30	0.24	0.46	0.46	0.81	0.38	0.48	0.39	0.53	0.49	0.47	0.43
Total Other foods	2.48	2.62	4.10	5.13	6.13	7.11	8.09	11.65	9.62	9.54	4.48	6.05

¹Food as purchased includes uncooked grain products; raw, canned, and frozen vegetables; fruit juice concentrates; dry beans and legumes; and meat with bones. Coffee and tea are in dried weight. Also, while fruit drinks, soft drinks, and ades may appear to be large in quantity for some adults, they typically translate to less than one 16-oz bottle of such drinks per day.

Table ES-1c. Market baskets of the Liberal Food Plan, pounds of food per week,¹ by age-gender group

Food Category	Children (years)			Males			Females			Males			Females			Males			Females		
	1	2	3-5	6-8	9-11	12-14	15-19	20-50	20-50	20-50	51+	51+	51+	51+	51+	51+	51+	51+	51+	51+	51+
<i>Pounds per week</i>																					
Grains																					
Breads, yeast and quick	0.26	0.46	0.81	1.32	2.11	1.64	2.21	2.04	1.99	1.59	1.48	1.33									
Breakfast cereals, cooked and ready to eat	0.75	0.53	0.72	0.37	0.75	0.22	0.45	0.26	0.41	0.26	0.34	0.46									
Rice and pasta	0.34	0.27	1.20	1.62	0.97	0.93	1.49	2.08	0.94	2.94	0.83	2.27									
Flours	0.12	0.15	0.25	0.46	0.37	0.91	0.60	0.84	0.62	0.72	0.57	0.39									
Grain-based snacks and cookies	0.09	0.11	0.23	0.14	0.17	0.14	0.26	0.21	0.18	0.21	0.16	0.15									
Total Grains	1.56	1.52	3.21	3.91	4.38	3.84	5.01	5.44	4.14	5.72	3.36	4.61									
Vegetables																					
Potato products	1.08	1.08	1.25	1.48	1.30	3.26	2.04	5.20	1.68	4.72	1.41	2.36									
Dark-green and deep-yellow vegetables	0.29	0.29	0.31	1.62	0.71	1.42	2.78	0.39	1.17	0.54	1.05	1.01									
Other vegetables	1.71	2.85	1.79	2.99	4.33	2.12	2.98	2.90	4.00	3.46	4.42	3.85									
Total Vegetables	3.07	4.22	3.36	6.08	6.34	6.80	8.49	7.80	8.49	8.71	6.89	7.22									
Fruits																					
Citrus fruits, melons, berries, and juices	0.53	0.55	0.72	1.50	1.04	0.99	1.31	0.87	1.74	1.24	3.19	2.32									
Noncitrus fruits and juices	3.56	2.40	2.00	2.86	4.04	4.77	3.44	9.01	3.80	7.64	3.02	4.55									
Total Fruits	4.09	2.95	2.72	4.36	5.08	5.76	4.75	9.87	5.54	8.88	6.21	6.87									
Milk products																					
Whole milk, yogurt, and cream	8.50	9.15	2.53	1.69	1.74	1.99	1.81	2.62	1.43	2.07	0.83	1.38									
Lower fat and skim milk, and lowfat yogurt	0.00	0.00	4.89	6.22	5.10	10.68	10.12	10.85	6.21	5.69	6.84	5.45									
Cheese	0.14	0.07	0.26	0.16	0.22	0.23	0.30	0.30	0.30	0.39	0.22	0.28									
Milk drinks and milk desserts	0.53	0.21	0.64	0.94	1.27	0.49	0.77	0.29	0.39	0.34	0.26	0.37									
Total Milk products	9.17	9.43	8.31	9.00	8.33	13.39	13.00	14.06	8.34	8.50	8.15	7.47									
Meat/meat alternates																					
Beef, pork, veal, lamb, and game	0.85	1.16	1.40	2.10	1.81	2.28	2.57	3.38	2.48	3.56	2.07	2.34									
Chicken, turkey, and game birds	0.63	1.09	1.29	2.32	1.38	1.67	0.97	1.92	2.28	1.53	2.34	1.86									
Fish and fish products	0.14	0.08	0.59	0.42	2.52	0.64	0.69	0.09	1.41	0.69	1.57	1.47									
Bacon, sausages, and luncheon meats	0.19	0.17	0.17	0.25	0.37	0.56	0.40	0.80	0.20	0.60	0.19	0.37									
Eggs and egg mixtures	1.54	1.13	0.69	0.24	0.25	0.55	0.46	0.38	0.49	0.23	0.58	0.41									
Dry beans, lentils, peas, and nuts	0.03	0.11	0.27	0.15	0.27	0.17	0.34	0.70	0.36	0.63	0.23	0.45									
Total Meat/meat alternates	3.38	3.73	4.41	5.47	6.62	5.87	5.42	7.26	7.23	7.23	6.98	6.90									
Other foods																					
Table fats, oils, and salad dressings	0.16	0.12	0.28	0.23	0.33	0.27	0.34	0.59	0.43	0.62	0.50	0.57									
Gravies, sauces, condiments, spices, and salt	0.12	0.07	0.14	0.17	0.18	0.22	0.30	0.26	0.29	0.37	0.30	0.39									
Coffee and tea	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.02	0.17	0.12	0.17	0.20									
Fruit drinks, soft drinks, and ades	1.72	2.01	3.82	2.63	4.66	4.55	5.86	5.71	7.22	4.29	3.10	2.96									
Sugars, sweets, and candies	0.13	0.46	0.50	0.53	0.43	0.30	0.56	0.41	0.56	0.41	0.35	0.39									
Total Other foods	2.13	2.66	4.75	3.56	5.62	5.34	7.06	7.00	8.67	5.81	4.43	4.51									

¹Food as purchased includes uncooked grain products; raw, canned, and frozen vegetables; fruit juice concentrates; fruit with bones; meat with bones. Coffee and tea are in dried weight. Also, while fruit drinks, soft drinks, and ades may appear to be large in quantity for some adults, they typically translate to less than one 16-oz bottle of such drinks per day.

The Low-Cost, Moderate-Cost, and Liberal Food Plans: 2003 Administrative Report

Introduction

The U.S. Department of Agriculture's (USDA) Low-Cost, Moderate-Cost, and Liberal Food Plans serve as national standards for nutritious diets at various costs. Each plan represents a set of market baskets, each of which is applicable to 1 of 12 age-gender groups. Each market basket contains a selection of foods in quantities that reflect recent dietary recommendations, food consumption patterns, food composition data, and food prices. The three food plans, as well as the fourth, the Thrifty Food Plan, are the official USDA food plans maintained by the USDA Center for Nutrition Policy and Promotion (CNPP). Revised in 1999, the Thrifty Food Plan represents the value that serves as the basis for food stamp allotments (see U.S. Department of Agriculture [USDA], 1999). Bankruptcy courts often use the value of the Low-Cost Food Plan to determine the portion of a bankruptee's income to allocate to necessary food expenses. The Department of Defense uses the value of the Moderate-Cost and Liberal Food Plans to set the Basic Allowance for Subsistence rate for all enlistees, while many divorce courts use the value of the USDA food plans to set alimony payments. All three of the plans are used in USDA's report, *Expenditures on Children by Families* (Lino, 2002), which is used to set State child support guidelines and foster care payments.

This report presents a revision of the previous market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans so that each reflects recent changes in dietary guidance as well as updated information on food composition, consumption patterns, and food prices. The report provides background information on the updated market baskets of the three plans and describes the data sources, dietary standards, and methods used to revise the market baskets. To provide better illustration of some of the implications of the new market baskets for the three plans, CNPP compared them with actual reported consumption patterns as well as with the previous market baskets.

The market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans are important as national standards that illustrate how a nutritious household diet based on various budgets can be consumed. Currently, regardless of income level, most families do not have a healthful diet (Basiotis, Carlson, Gerrior, Juan, & Lino, 2002). Therefore, the market baskets of the three food plans are useful as illustrative guides in educational programs and as references for policies that are designed to help families budget their food dollars effectively and to improve their diets.

Background of the Food Plans

For over 100 years, the USDA has prepared guides for selecting nutritious diets at different cost levels. In 1894, based on the work of pioneer nutrition investigator W.O. Atwater, the Department published information on the quantity of foods that were purchasable at a relatively economical price and met the nutrient standard for the average American male performing “moderate muscular work.” Into this original food plan, USDA factored in nutrient needs, food composition, and relative food prices—the same criteria still used in the development of the food plans (Cofer, Grossman, & Clark, 1962).

By the 1920s, research had demonstrated the presence of minerals and vitamins in foods and their value to the diet. Basic food plans were developed that were adequate in nutrients, moderate in cost, and satisfying in flavor. These early food plans or diet guides provided consumers with practical and economical advice on healthful eating. By the 1930s, the USDA published diets at four levels of nutritive content and costs: (1) the Restricted Food Plan diet for Emergency Use, (2) the Minimum-Cost Food Plan, (3) the Moderate-Cost Food Plan, and (4) the Liberal Food Plan. The Restricted and Minimum-Cost Food Plans were used for low-income families affected by the Depression and were subsequently replaced in the early 1940s by the Low-Cost Food Plan (Cofer et al., 1962).

In 1961, the Economy Food Plan was developed as a nutritionally adequate diet for use when the cost of food must be lower than the average food expenditures of low-income families. This plan, priced at less than the Low-Cost Food Plan, served as the basis for food stamp allotments as stipulated in the 1964 Food Stamp Program Act. In 1975, the Economy Food Plan was replaced by the Thrifty Food Plan (TFP), which represented a completely new set of market baskets but at the same minimal cost as the market baskets of the Economy Food Plan. Thus, the TFP became the new basis for food stamp allotments.

The USDA food plans were revised every 8 to 10 years (in 1957, 1967, 1975, and 1983) to reflect changes in dietary guidance, consumption behavior, and food prices. The TFP was last revised in 1999 (see USDA, 1999) by using 1989-91 data. The last revision of the Low-Cost, Moderate-Cost, and Liberal Food Plans was in 1983 and used 1977-78 data (Cleveland & Peterkin, 1983). Since 1977-78, the Recommended Dietary Allowances (RDAs) and *Dietary Guidelines for Americans* have been updated, and the *Food Guide Pyramid* was introduced (USDA, 1996). The nutrient composition of foods has changed since the late 1970s, reflecting advances in food science, changing fortification policy, and evolving consumer demands for foods that are more convenient and healthful. Changing demographics have resulted in many new foods being introduced into the marketplace. Finally, relative food prices have changed over time, affecting food choices and consumption patterns.

Data and Methods

Data

CNPP used two main data sources to revise the market baskets of the three food plans: USDA's 1989-91 Continuing Survey of Food Intakes by Individuals (CSFII) and the Food Price Database.¹ With assistance from the USDA Economic Research Service, CNPP created the Food Price Database by merging food items from the CSFII with national data on food prices.

1989-91 Continuing Survey of Food Intakes by Individuals

The CSFII provides detailed information on people's reported intake of food at home and away from home, as well as demographic and socioeconomic information. The CSFII is nationally representative of individuals living in households in the 48 coterminous States. Lower income households are oversampled to increase analytical precision of this group's information. To make the sample representative of the U.S. population, CNPP used the survey's sampling weights.

For the 1989-91 CSFII, dietary intakes by individuals were collected over 3 nonconsecutive days. Day-1 data were collected by using in-person interviews and a 24-hour dietary recall method. For the other 2 days, participants kept food diaries. This study used data from Day-1 food intake by individuals ages 1 and older in households. For children under age 12, the parent or main-meal planner provided the information, often with the assistance of the child. Response rates were higher for the first day than for the last 2 days; thus, the subsequent days were not used for this analysis. One-day data have been shown, in prior research, to be reliable measures of usual food intakes by groups of people (Basiotis, Welsh, Cronin, Kelsey, & Mertz, 1987).

The 1989-91 CSFII contains information on 9,961 individuals ages 1 and older, who collectively reported consuming about 4,800 different foods. The CSFII data set also contains information on the ingredients, nutrient content, and amount consumed of each of these foods.

Food Price Database

The earlier Nationwide Food Consumption Surveys used in the development of previous food plans included information on household food expenditures from which food costs could be derived. The 1989-91 CSFII, however, does not

¹Since this project was undertaken, the 1994-96 CSFII became available. It was not, however, used for this project primarily because the Food Price Database pertains to the 1989-91 CSFII. The Food Price Database is essential to revisions of the market baskets.

contain information on either food prices or food expenditures. Thus, CNPP constructed the Food Price Database specifically for this study by merging information from the CSFII on foods consumed with information on prices from national data sets.² For this study, creation of the Food Price Database involved several steps: (1) identifying all foods reported in the CSFII as being consumed at home and away from home and using recipes to disaggregate foods into their specific ingredients, (2) adjusting ingredient quantities for cooking and waste factors, when appropriate, to convert foods to a purchasable form, (3) pricing the purchasable ingredients by using databases of national retail prices, and (4) converting the priced retail ingredients back to the consumed form of the food with a price now attached to it.

Some foods or food ingredients—for example, milk on cereals or luncheon meats in sandwiches—are in a form that can be readily purchased (and priced). However, other consumed foods have been cooked or prepared (peeled, shelled, etc.) and needed to be adjusted to retail form before they could be priced. For such foods, conversion factors, which adjust for the loss or gain in weight that is due to cooking and preparation, were applied to all relevant ingredients.³ For instance, steamed vegetables were converted to raw, unprepared forms; cooked pasta, to its uncooked form; cooked eggs, to eggs with shells; and peeled bananas, to its purchasable form with a peel.

CNPP used four sources of data to determine which retail prices to use in calculating the costs of foods: (1) the A.C. Nielsen Scantrack system, which was used to price most food ingredients, (2) Department of Labor Bureau of Labor Statistics price data for miscellaneous foods, (3) USDA Agricultural Marketing Service price data for fresh produce and meat, and (4) Department of Commerce National Marine Fisheries Service price data for fish. The average price of all brands (including national, store, and generic) of a food ingredient was used to price that food ingredient. For example, the average price of all brands of whole milk was used to price whole milk, and the average price of all types of corn flakes was used to price corn flakes. Food ingredients were priced in dollar amounts per 100 grams, and the CSFII Survey Code Book and Survey Recipe File, together with label information on supermarket products, were used to convert fluid ounces to gram weights.

²See the article by Bowman (1997) in Appendix 1 for a detailed description of the construction of the Food Price Database.

³USDA Agriculture Handbook No. 8 (series), *Composition of Foods* (USDA, 1976-1992), contains data on the weight of cooked and uncooked foods. These data permit computation of cooking conversion factors. Conversion factors that adjust for waste when food is prepared (e.g., due to peeling, coring, slicing, and dicing) are found in USDA Agriculture Handbook No. 102 *Food Yields: Summarized by Different Stages of Preparation* (USDA, 1975). Food ingredients that are cooked and/or have a preparation waste factor were converted by using either or both conversion factors and then priced.

All food ingredients were then converted back to the food as it was consumed and priced per 100 grams. To illustrate: first, scrambled eggs were separated into ingredients—egg, without shell, milk, table fat, and salt. These ingredients were then adjusted for any loss in weight attributable to cooking (e.g., the loss of moisture in eggs and milk) and for waste during food preparation (e.g., the shell of the egg). CNPP used national average prices to price each of the ingredients per 100 grams. The food ingredients were then regrouped into the food as it was consumed—the scrambled eggs—and this food was priced per 100 grams. Because the USDA food plans provide the cost of eating at home, for purposes of calculating the cost, CNPP assumed that all the foods that people said they ate were prepared at home.

Methods

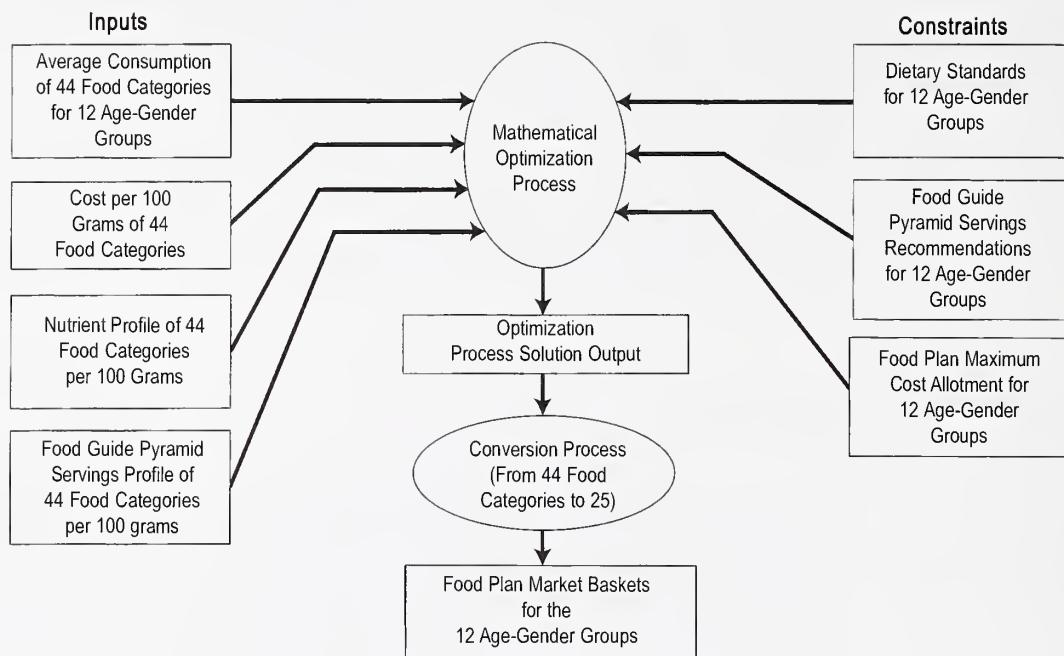
Development of each food plan consisted of three major steps: (1) Selecting a survey sample to use as the basis for the food plan at a particular cost level, (2) establishing dietary standards and a cost limit for the food plan, and (3) using a mathematical model to develop the food plan. The model was designed to identify food market baskets that represent the smallest change needed in actual food consumption patterns, which meet the desired dietary standards and cost limit.

An overview of the method used to update the market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans is shown in figure 1. For each plan, CNPP calculated a revised market basket for 12 age-gender groups: *Children* ages 1, 2, 3-5, 6-8, and 9-11; *Females* ages 12-19, 20-50, and 51 and older; and *Males* ages 12-14, 15-19, 20-50, and 51 and older. Key factors used in the selection of the age-gender groups were nutritional needs, similarity to RDA age categories, and comparability to age-gender categories used in previous food plans.

For modeling purposes, CNPP assigned each of the 4,800 foods reported in the CSFII into 1 of 44 food categories (presented in table 1 with some examples of foods in each category). Foods were assigned to food categories based on similarity of nutrient content, food costs, use in meals, and their placement in the *Food Guide Pyramid*. (See Appendix 2 for Food Category Database Documentation.)

To calculate a market basket for a Low-Cost, Moderate-Cost, and Liberal Food Plan for each age-gender group, CNPP estimated a mathematical optimization model for each group, resulting in a total of 36 models, that is, three plans for each of the 12 age-gender groups. For each age-gender group, the model selected the optimal food plan that met the dietary standards and cost constraints with as little change as possible from actual reported food consumption. Each model consisted of 4 sets of data inputs related to each of the 44 food categories, subject to 3 constraints. The inputs were average consumption of foods in the

Figure 1. Food Plan Methods



44 categories, average cost per 100 grams of foods in the 44 categories, average nutrient profile of foods in the food categories, and average servings profile of the food categories, which are based on the *Food Guide Pyramid*. The constraints were dietary standards, serving specifications of the *Food Guide Pyramid*, and the constant cost of food plan market baskets (corresponding to the period during which the food consumption data were collected).

Model Inputs

Average consumption of food in each of the 44 food categories

The Low-Cost, Moderate-Cost, and Liberal Food Plans have historically reflected the consumption patterns and eating habits of people and have been reported in quartiles for food-spending: the Low-Cost Plan corresponds to people's food consumption at the second quartile (25th to 50th percentile) of food expenditure; the Moderate-Cost Plan, the third quartile (50th to 75th percentile) of food expenditure; and the Liberal Plan, the upper quartile (75th to 100th percentile) of food expenditure. To create acceptable market baskets, the optimization model minimizes deviations from the food consumption habits of each age-gender group within each expenditure quartile. That is, the final market baskets are as close as possible to people's original consumption habits, while still meeting dietary and cost constraints. To accomplish this, CNPP determined and entered the average consumption patterns of each of the 12 age-gender groups for the 44 food categories into each model for the Low-Cost, Moderate-

Cost, and Liberal Food Plans. For example, the average consumption pattern of a child age 9-11 in the third quartile of food expenditure was entered into the model when the market basket was estimated for the Moderate-Cost Food Plan for a child age 9-11.

CNPP adjusted each person's consumption of each of the 44 food groups to the Recommended Energy Allowance (REA) for the appropriate age-gender group. If a person reported consumption below or above his or her REA, then consumption was adjusted to 100 percent of the REA. In the CSFII, this correction adjusts for individuals who underreport their consumption and ensures the overall quantity of food in each market basket is consistent with the energy recommendations of the Food and Nutrition Board (National Academy of Sciences, 1989b).

Similar to what was done in the previous food plans and consistent with research on household discard of edible food (USDA, 1983a, 1983b), CNPP also added a percentage allowance to reported intake for each of the 44 food categories to account for food waste resulting from plate waste or spoilage. This was done for each age-gender group. The allowances factored into each food plan to account for waste were as follows: 10 percent for the Low-Cost Food Plan, 20 percent for the Moderate-Cost Food Plan, and 30 percent for the Liberal Food Plan. These percentage allowances are the same as those used with the previous food plans and were used because we have no recent knowledge about food waste within households.

Although the revised food plans begin with average consumption, they may deviate from this to satisfy the dietary standards of the plan. This deviation occurs because average consumption of many foods—especially fruits and vegetables—is far below recommended consumption. Consumption of some other foods or food components—fats, added sugars, and sodium—is above recommended levels. Only a small percentage of Americans consume the recommended number of servings of the five major food groups of the *Food Guide Pyramid* (Basiotis et al., 2002).

Average price of each of the 44 food categories

As described in the data section, the Food Price Database contains estimated food costs for food items consumed per 100 grams of the food. For each of the three food plans, the weighted average price per 100 grams of each of these food categories was then determined based on the sample's average consumption. For example, the food category of “noncitrus fruits and juices” includes apples, apricots, bananas, and cherries. The average price per 100 grams of this food category was based on the average price of these individual food items weighted by their consumption share. Apples and bananas received a greater weight proportionately because of more frequent consumption. The sample's average consumption, compared with each age-gender group's average consumption, was used to calculate weights for the food items because food prices do not vary by age-gender group.

Table 1. Food categories and foods in each category: Low-Cost, Moderate-Cost, and Liberal Food Plans

Food category	Examples of foods
Grains	
Breads, yeast and quick—high fiber	Whole wheat, rye, oatmeal, bran, and pumpernickel rolls and breads; corn tortillas and taco shells; and muffins, bagels, waffles, and pancakes made from whole-grain flours or containing bran
Breads, yeast and quick—regular fiber	White rolls and breads; muffins, bagels, waffles, pancakes, and scones not made from whole-grain flours or containing bran; and biscuits, cornbread, and croissants
Breakfast cereal—high fiber	Oatmeal, barley, bulgur, oat bran cereals, and ready-to-eat cereals having 3.7% or more fiber (e.g., shredded wheat)
Breakfast cereal—regular fiber	Corn meal or grits, cream of wheat, and ready-to-eat cereals having less than 3.7% fiber (e.g., corn flakes)
Rice and pasta	All types of rice, spaghetti, noodles, and macaroni
Cakes, pies, and other sweet bakery products	Cakes, cookies, pies, pastries, doughnuts, sweet rolls, croissants with sweet filling, sweet crackers including graham crackers, and breakfast or granola bars
Grain-based snacks	Crackers, popcorn, pretzels, and salty snacks
Grain mixtures—regular fat	Tacos, burritos, enchiladas, pasta and rice with meat, pizzas, and egg rolls having 6% or more fat content
Grain mixtures—lowfat	Rice and pasta with vegetables and/or beans, and noodle or rice soups with vegetables and/or meat having less than 6% fat content
Vegetables and fruits	
Potato products—high fat	Potato chips, french-fried potatoes, hash browns, potato puffs, potato patty; and potato salads and mashed potatoes with added fat, eggs, and cheese
Potato products—regular fat	Boiled, baked, scalloped, mashed, and stuffed potatoes; and potato salad, German style
Green-yellow vegetables—added fat	All dark-green and deep-yellow vegetables such as broccoli, chard, collard greens, kale, spinach, carrots, pumpkin, squash, and sweet potato—with or without added fat; and juices from these vegetables
Green-yellow vegetables—no added fat	
Other vegetables—added fat	All other vegetables such as beans, beets, cabbage, cauliflower, corn, cassava, eggplant, green peas, lettuce, bell pepper, snow peas, tomatoes, turnip, and Brussels sprouts that are not dark-green or deep-yellow vegetables—with or without added fat; and juices from these vegetables
Other vegetables—no added fat	
Mixed vegetables—added fat	Mixed vegetables containing corn, lima beans, and peas; vegetable salads; stuffed vegetables; and other mixed vegetable dishes—with or without added fat. Mixed vegetables with added fat include creamed peas and carrots, batter-dipped fried vegetables, cole slaw with dressing, and vegetables in combination with other foods such as cheese and nuts
Mixed vegetables—no added fat	
Citrus fruits, melons, berries, and juices	Limes, lemons, grapefruits, oranges, and tangelos; melons such as cantaloupe, honeydew, and watermelon; berries such as blackberries, blueberries, cranberries, raspberries, and strawberries; and juices from these fruits
Other noncitrus fruits and juices	All other noncitrus fruits such as apples, apricots, bananas, cherries, grapes, papayas, peaches, pears, and plums; and their juices
Milk products	
Milk and milk-based foods—regular fat	All fluid, evaporated, condensed, and dry whole milk; regular yogurt; all fluid creams; cream substitutes; cream cheese; and dips
Milk and milk-based foods—lower fat	All fluid, evaporated, and dry reduced-fat and skim milks; buttermilk; and lowfat or nonfat yogurts
Cheese	Natural, processed, and imitation cheeses, cottage cheese, cheese spreads, cheese dips, and cheese soups

Continued

Table 1. Food categories and foods in each category: Low-Cost, Moderate-Cost, and Liberal Food Plans (cont'd)

Food category	Examples of foods
Milk-based drinks and desserts—regular fat	Milk-based drinks such as malted milk, hot chocolate, eggnogs, cocoa, infant formulas, and meal-replacement drinks with a fat equivalent to that of whole milk; and dairy desserts such as ice cream, frozen yogurt, ice milk, custard, puddings, and tofu-frozen desserts having more than 6% fat
Milk-based drinks and desserts—lower fat	Milk-based drinks made with reduced-fat or skim milk and dairy desserts having 6% or less fat
Meat/meat alternates	
Red meats—high fat, regular cost	Beef, pork, veal, game meats, and organ meats with 10% or more fat
Red meats—high fat, low cost	
Red meats—lean, regular cost	Beef, pork, veal, and game meats with less than 10% fat
Red meats—lean, low cost	
Poultry and fish—high fat, regular cost	Chicken, turkey, duck, Cornish hen, game birds, and organ meats, and all fish and shellfish, with 10% or more fat
Poultry and fish—high fat, low cost	
Poultry and fish—lean, regular cost	Chicken, turkey, duck, Cornish hen, and game birds, and all fish and shellfish, with less than 10% fat
Poultry and fish—lean, low cost	
Lunch meats, sausages, and bacon—regular fat	Sausages, salami, frankfurter, bologna, sliced ham, bacon, and pastrami
Lunch meats, sausages, and bacon—lowfat	Sausages, salami, frankfurter, bologna, sliced ham, bacon, and pastrami having less than 25% fat than does the regular-fat category
Egg and egg mixtures	Fresh, frozen, and dried eggs; egg substitutes; meringues; and egg mixtures
Meat, poultry, and fish mixtures—regular fat	Beef, veal, pork, lamb, chicken, turkey, and fish with grain or vegetables with 8% or more fat
Meat, poultry, and fish mixtures—lowfat	Beef, veal, pork, lamb, chicken, turkey, and fish with grain or vegetables with less than 8% fat
Dry beans, peas, lentil dishes, and mixtures	Black, red, pinto, lima, white, mung, and kidney beans; all types of peas with or without other foods; soybean products such as miso, tofu, and soybean-based meat substitutes
Nuts and seeds	Nuts, peanut butter and other nut butters, nut mixtures, carob, and seeds such as sesame and pumpkin
Other foods	
Fats, oils, salad dressings, sauces, and condiments	Butter; margarine; vegetable oils such as corn oil, olive oil, and sunflower oil; butter blends; salad oils; lard; shortenings; all salad dressings; mayonnaise; pickles; relishes; salsa; soy sauce; catsup; tomato paste; and gravies and sauces
Coffee and tea	Instant, ground, and fluid coffees and teas with or without caffeine and with or without sugar or sweeteners
Fruit drinks, soft drinks, and ades—regular calorie	Fruit drinks; cola- and pepper-type soft drinks; ginger ale; root beer; and fruit punches, ades, lemonades, limeades, and other sodas containing sugar
Fruit drinks, soft drinks, and ades—low calorie	Sugar-free or low-sugar drinks such as cola- and pepper-type soft drinks, ginger ale, root beer, fruit-flavored drinks, fruit punches, ades, lemonades, and other sodas
Sugars and sweets	All types of sugars, sweeteners, and syrups such as honey, jams, jellies, marmalades, preserves, icings, gelatin desserts, marshmallow, fudge, all types of candies and chocolates, and chewing gum

Note: For more complete definitions of regular fat and lowfat, regular cost and low cost, and other terms for a particular food category, see Appendix 2.

The average price of the 44 food categories was calculated for people in the second, third, and upper food-spending quartiles; hence, three profiles of food prices corresponded with each food plan. The prices for each food category differed among the three spending quartiles because consumption of food in each quartile varied. The average price of the 44 food categories for the appropriate food-spending quartile was then entered into the model for each food plan.

Profiles of nutrients and Food Guide Pyramid servings of each of the 44 food categories

The 1989-91 CSFII Nutrient Database contains information on the nutrient content (including food energy, vitamins, minerals, and other dietary components, such as cholesterol and dietary fiber) of each of the foods that people reported consuming. Using this database, CNPP calculated the weighted average nutrient content of each of the 44 food categories per 100 grams. For example, the low-cost group for lean types of poultry and fish consists of foods such as baked chicken, broiled turkey breast, and tuna. The average nutrient profile of this food category was calculated based on the food items in the category and the average consumption of each item. Weights for the food items were again based on the average consumption by all people. The sample's average consumption, as opposed to each age-gender group's average consumption, was used because the food plans are for household-wide use.

Servings profiles of each of the 44 food categories were also an input into the model: the average weighted number of servings of grains, vegetables, fruits, milk products, and meat/meat alternates contained in each food category. Many food categories yielded servings for only one Pyramid food group (e.g., cheese contributed servings to the milk products group only). Other food categories, however, contributed servings to more than one Pyramid food group (e.g., mixed grains can contain servings of grains, vegetables, and meat/meat alternates).

The average nutrient and *Food Guide Pyramid* profile of the 44 food categories was calculated for people in the second, third, and upper quartiles of food spending. Hence, there are three nutrient profiles and three *Food Guide Pyramid* profiles, one corresponding to each food plan. The nutrient and *Food Guide Pyramid* profiles for each food category differed among people in the three spending quartiles because consumption of food in each quartile varied. The average nutrient and *Food Guide Pyramid* profiles of the 44 food categories for the appropriate quartile of food spending was then entered into the model for each food plan.

Model Constraints

Dietary standards

The revised food plans incorporate recent knowledge about dietary needs and recommendations. Table 2 shows major differences in dietary standards between the old and the revised food plans. The new market baskets for the food plans for each age-gender group meet dietary standards for (1) food energy and 15 essential nutrients (protein, vitamin A, vitamin E, vitamin C, thiamin, riboflavin, niacin, vitamin B₆, folate, vitamin B₁₂, calcium, phosphorus, magnesium, iron, and zinc),⁴ (2) total fat and saturated fat, (3) cholesterol, (4) carbohydrate, and (5) serving recommendations of the *Food Guide Pyramid*. Recommendations for sodium and dietary fiber were also used in the revised food plans. Added sugar was limited by controlling the quantity of foods that are major sources of added sugars.

The 1989 REAs and Recommended Dietary Allowances (RDAs) for various age-gender groups are the levels of intake of food energy and essential nutrients that are considered adequate to meet the nutrient needs of practically all healthy Americans in the group (National Academy of Sciences, 1989b). For the revised food plans, the market baskets for each age-gender group had to meet the group's 1989 REA and 100 percent or more of its 1989 RDAs for the 15 essential nutrients. Because the age-gender groups used in this study do not always correspond exactly with the 1989 REAs and RDAs, CNPP interpolated recommendations for these age-gender groups.

Consumption limits for fat and saturated fat in the revised market baskets were based on the 1995 *Dietary Guidelines for Americans* (USDA & DHHS, 1995). These Guidelines recommend that adults and children ages 5 and older consume no more than 30 percent of total food energy (calories) per day from total fat and less than 10 percent of calories per day from saturated fat. For children under age 2, however, the Guidelines for fat do not apply. For children ages 2 to 5, the Guidelines recommend gradually reducing intake of total and saturated fat to no more than 30 percent (total fat) and less than 10 percent (saturated fat) of total calories per day by the time the child is about 5 years old (USDA & DHHS, 1995) because young children need sufficient calories for growth and development. Total and saturated fat consumption was, therefore, unrestricted for children age 1 and was constrained at consumption levels for children ages 2 to 4. The 2000 *Dietary Guidelines for Americans* (USDA & DHHS, 2000) have been issued since this project was undertaken; however, the new Guidelines for total and saturated fat consumption are similar to those of 1995.

⁴While Dietary Reference Intakes (DRIs) for macronutrients, vitamins, and minerals were released prior to the publication of this report, they are not used to establish dietary standards. The 1989 RDAs were used instead, because they better align with the age-gender categories specified by the plans and reflect the nutrients from foods consumed during the study period. Furthermore, CNPP decided to keep the methodology of these food plans consistent with that of the Thrifty Food Plan.

Table 2. Dietary standards of the previous and revised market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans

Constraint	Previous market baskets	Revised market baskets
RDAs for each age-gender group	1980 RDA	1989 RDA
Food energy	Midpoint of RDA	Average energy allowance
Protein, vitamin A and vitamin C, thiamin, riboflavin, niacin, vitamin B ₁₂ , calcium, phosphorus, magnesium, and iron	100% RDA	100% RDA
Vitamin E, folate, and zinc	80% RDA	100% RDA
Vitamin B ₆	0.02 gm/gm protein	100% RDA
Dietary Guidelines		
Total fat	35% or less of total calories	30% or less of total calories for adults and children ages 5 ¹ and older; at average consumption for children ages 2 to 4; unrestricted for children age 1
Saturated fat	No constraint	Less than 10% of total calories for adults and children ages 5 and older; at average consumption for children ages 2 to 4; unrestricted for children age 1
Other recommendations		
Sodium	1,600 mg/1,000 Kcal	No more than 100% of average consumption; unrestricted for children age 1
Cholesterol	350 mg/day or less	300 mg/day or less; unrestricted for children age 1
Fiber	No constraint	No less than 100% of average consumption
Carbohydrate	No constraint	55% or more of total calories/day
Caloric sweeteners/added sugars	12% of total calories	No more than 100% of average consumption
Food Guide Pyramid servings		
Grains	No constraint	Minimum of 6; maximum of 11 servings/day ²
Vegetables	No constraint	Minimum of 3; maximum of 5 servings/day ²
Fruits	No constraint	Minimum of 2; maximum of 4 servings/day ²
Milk products	No constraint	Minimum of 2; maximum of 3 servings/day ²
Meat/meat alternates	No constraint	Minimum of 2; maximum of 3 (5 to 7 ounces) servings/day ²
Fats, oils, and sweets	No constraint	No more than 100% of average consumption

¹All ages are in years.

²Minimum and maximum servings vary by age-gender group. Maximum servings are specified to ensure that the minimum number of servings from all Pyramid food groups are included in the market baskets before the maximum number of servings of any one of the food groups is exceeded. Serving sizes for children through 3 years old are modified by reducing the serving size by one-third, except for milk product servings.

The National Research Council's *Diet and Health Report* was the source of dietary standards for cholesterol, carbohydrate, and sodium (National Academy of Sciences, 1989a). This report (a consensus by experts in foods and nutrition, medicine, epidemiology, public health, and related fields) recommends that people ages 2 and over limit their daily intake of cholesterol to 300 milligrams or less and that all people consume 55 percent or more of their calories per day from carbohydrates. These recommendations were incorporated into the revision of the market baskets for the food plans for each age-gender group. Regarding sodium, the *Diet and Health Report* recommends that people ages 2 and over limit their daily intake to 2,400 milligrams or less, a limit that is difficult to achieve because so many grain products contain sodium, and grains are a recommended component of a healthful diet. The sodium standard in the model, therefore, was fixed at no more than average consumption for each age-gender group. For children age 1, no restriction was set on sodium, a recommendation of the *Diet and Health Report*.

Although the *Dietary Guidelines for Americans* do not recommend a quantitative standard for dietary fiber or caloric sweeteners/added sugars, they do promote the benefits associated with a diet high in fiber and moderate in sugars. The *Diet and Health Report* contains similar recommendations. Because of the lack of precise numeric guidelines, CNPP constrained the revised market baskets for each age-gender group so that the market baskets could provide no less than average consumption of dietary fiber and no more than average consumption of foods high in added sugars. The actual market baskets for each age-gender group, however, contain more fiber and fewer foods high in added sugars than average consumption because of the influence of other dietary standards.

This revision of the market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans is the first one to incorporate serving recommendations of the *Food Guide Pyramid*. The Pyramid translates recommendations from the *Dietary Guidelines for Americans* into the type and amount of foods people can eat to have a healthful diet. It specifies the number of servings of the major food groups (grains, vegetables, fruits, milk products, and meat/meat alternates) that people of different age-gender groups need to eat in order to have a healthful diet. For the revision of each of these three plans, the market basket for each age-gender group had to meet the serving requirements of the five major food groups of the Pyramid. In establishing the serving recommendations of the five food groups, CNPP used energy intake levels of 1,600, 2,200, and 2,800 calories and interpolated serving recommendations for people with other food energy needs. The REA for children ages 3 and younger is less than 1,600 calories, so the recommended number of servings for these children was held at the servings for 1,600 calories, but the serving size was scaled proportionately downward (except for milk products) based on their food energy needs. This approach is consistent with guidance based on the *Food Guide Pyramid*.

A food item or ingredient that makes up at least one-fourth of a *Food Guide Pyramid* serving was counted in calculating Pyramid servings. Because a food item or ingredient that was less than one-fourth of a *Food Guide Pyramid* serving was not counted,⁵ consumption of Pyramid food groups was underestimated. This data limitation required CNPP to adjust serving recommendations of the Pyramid downward by 10 percent to compensate for food components in a food item that were not counted toward a serving of a particular food group (e.g., raisins in raisin bread).

Although the 2000 *Dietary Guidelines for Americans* and Dietary Reference Intakes for macronutrients, vitamins, and minerals are now available, they were not finalized when CNPP revised the Thrifty Food Plan. Thus, CNPP chose to make the revisions of the Low-Cost, Moderate-Cost, and Liberal Food Plans consistent with the revision of the Thrifty Food Plan.

Cost and other constraints

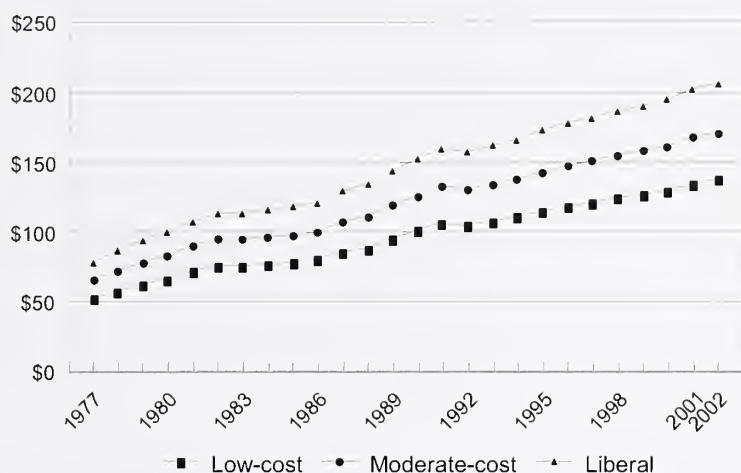
Cost, in real terms, was a primary constraint satisfied by the new market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans; each should cost no more than the previous baskets. Accordingly, because 1989-91 consumption data underlie this revision of the market baskets, CNPP constrained the cost of each age-gender group's revised market basket to equal the average real cost of its previous market basket. Specifically, 1989 and 1990 costs were adjusted to 1991 costs, which were entered into the model. This constant real-cost constraint was used to derive new nutritious market baskets for each food plan and to keep the real value (cost) of the food plans consistent across the years. The value of the three food plans from June 1977⁶ to June 2002 is depicted in figure 2.

CNPP considered other food-cost options. The previous costs of the revised Low-Cost, Moderate-Cost, and Liberal Food Plans were set at the midpoint of the respective 1977-78 food-spending quartile for each age-gender group (USDA, 1983c). For example, the cost of the Low-Cost Plan for a male age 20-50 was set at the 37.5-percent level on the distribution of food spending (the midpoint of the 25th to 50th quartile) for a male age 20-50. The 1989-91 midpoints of the quartiles of this distribution of estimated food costs were similar to the published costs of the Low-Cost and Moderate-Cost Food Plans; the midpoints were higher than the published cost of the Liberal Food Plan. CNPP also considered using the Federal Government's Consumer Expenditure Survey (CE) to estimate food expenditures; however, the CE contains household-level rather than individual-level food expenses that are needed to estimate specific age-gender food plans.

⁵This data limitation was beyond CNPP's control.

⁶The previous market baskets were based on 1977-78 data.

Figure 2. Weekly cost of Low-Cost, Moderate-Cost, and Liberal Food Plans for a family of four, 1977 to 2002



Note: Family of four consists of couple ages 20-50 and two children ages 6-8 and 9-11. Weekly cost is for June of each year.

The market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans for each age-gender group were also constrained to be within a range of average consumption for each of the 44 food categories, thus ensuring that no food category was eliminated from any market basket. The lower bound was set slightly above zero for most food categories. The exceptions were all of the vegetables, fruits (including juices), and legumes and nuts categories, where the range was set not to be below 90 percent of consumption and thus ensured that these foods were included in each market basket. The upper bounds were set at six times consumption for most food categories to keep any particular food category from increasing to an unreasonable level. The upper bound for milk-based drinks and desserts (regular and lower fat), fruit drinks, soft drinks, and ades (regular and low calorie), and sugars and sweets was set at average consumption to avoid excessive levels of these food categories in each market basket. The lower and upper bounds of the various food categories were based on consultation with nutrition researchers and examination of the consumption distribution of each food category.

Mathematical Model

Since 1975 a computerized quadratic mathematical programming model has been used in the development of the food plans. For each age-gender group, the model selects the optimal food plan that meets the dietary standards, cost constraints, and other constraints—and does so with as little change as possible from reported food consumption. As stated earlier, CNPP estimated a model for each of the 12 age-gender groups for each of the three food plans; hence, 36 models were estimated. To accommodate the 44 food categories, additional dietary constraints, and serving specifications of the *Food Guide Pyramid*, the mathematical model used with the 1983 Food Plans was modified to reflect consumer behavior more accurately. CNPP used the food budget shares of each of the 44 food categories to weight the objective function of the model for each age-gender group for each food plan. Thus, the solution gives priority to food categories that consumers value more.

Another improvement in the model is the use of logarithms of quantities rather than actual quantities, resulting in a model that is more resistant to decreases than to increases in consumption of any food category, a more realistic consumer behavior than symmetry of response. Nonetheless, this model, like all models, remains an approximation of people's consumption behavior. The important point is that the mathematical model for the revised food plans provides people with illustrative market baskets for each plan. From these illustrations, consumers can develop daily food plans and recipes that provide nutritionally adequate, healthful meals at various cost levels.

The model is derived from economic theory. A USDA team of economists and nutritionists that revised the food plans began with a utility function based on the Linear Expenditure System and assumed people were maximizing their utility (or happiness) within their budget. The team added to the food plans an additional set of constraints that forced the model to meet dietary standards. The other goal was to deviate as little as possible from observed average consumption while these additional constraints were satisfied.

The actual model is:

Minimize the objective function:*

$$\sum_f (FBS)_f (\ln(FP)_f - \ln(Current)_f)^2$$

Subject to:

$$\sum_f (FP)_f (p)_f \leq \text{Set Cost Limit}$$

$$\sum_f (\text{Quantity of nutrient group in } FP_f) \geq 1989 \text{ RDA}$$

$$\sum_f (\text{Amount of total fat in } FP_f) \leq 30\% \text{ of total kilocalories}$$

$$\sum_f (\text{Amount of saturated fat in } FP_f) < 10\% \text{ of total kilocalories}$$

$$\sum_f (\text{Amount of carbohydrates in } FP_f) \geq 55\% \text{ of total kilocalories}$$

$$\sum_f (\text{mg of cholesterol in } FP_f) \leq 300 \text{ mg}$$

$$\sum_f (\text{grams of fiber in } FP_f) \geq \text{average consumption of fiber for age-gender group}$$

$$\sum_f (\text{mg of sodium in } FP_f) \leq \text{average consumption of sodium for age-gender group}$$

$$\sum_f (\text{kilocalories in } FP_f) = 1989 \text{ REA for age-gender group} \pm 5 \text{ percent}$$

$$\sum_f (\text{Number of Pyramid group servings in } FP_f) \geq \text{Recommended for age-gender group}$$

$$(FP)_g \geq 0.90 (\text{current})_g$$

$$(FP)_h \geq 0.01 (\text{current})_h$$

$$(FP)_j \leq 1.0 (\text{current})_j$$

$$(FP)_k \leq 6.0 (\text{current})_k$$

Where:

$$FBS_f = \text{Food Budget Share} = \frac{p_f(\text{Current})_f}{\sum_f p_f(\text{Current})_f}$$

f = food group (44 food groups)

p_f = price of food group f

FP_f = amount of food in food group f at Food Plan level in grams

Current_f = amount of food in food group f at Current Consumption Level in grams

Nutrient group = protein, thiamin, riboflavin, niacin, folate, calcium, phosphorous, magnesium, iron, zinc, vitamins A, E, C, B₆, B₁₂

g = legumes, fruits, vegetables

h = all other groups not included in g

j = milk desserts, soft drinks and ades (nondiet); sugars and sweets

k = all other groups not included in j

*The objective function states that the food plan basket should be as close to current consumption as possible. The food budget share (FBS) weight gives higher priority to food groups on which consumers spend more of their budget. The food plan objective function is constructed to minimize the distance between the optimal food consumption and current consumption while simultaneously meeting the 14 group constraints listed under "Subject to."

Market Baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans

The optimization model yielded 12 market baskets (one for each age-gender group) for each of the three food plans. Each market basket contained quantities of each of 25 food categories in pounds per week. The optimization solution was in “as consumed” quantities of the 44 food groups (in grams per day). The final market baskets were simplified to pounds per week an individual would need to purchase to consume the recommended amounts. The market baskets were also based on 25 food categories, which many grocery shoppers can relate to, instead of the 44 nutrition and cost-based groups.

For example, CNPP combined high-fiber and regular-fiber “as consumed” categories of breakfast cereals to create one category of “as purchased” breakfast cereals; high-fat and regular-fat potato products to create one category of potato products; and several categories of red meat (high fat, regular cost; high fat, low cost; lean, regular cost; and lean, low cost) to create one category of red meat. The dietary standards are still maintained when the 44 food categories are collapsed into 25 food categories. Table 3 lists the 25 food categories of the market baskets and examples of the types of foods they contain.

The new market baskets consist of quantities of the 25 food categories that, in turn, fall into one of the food groups of the *Food Guide Pyramid* (grains, vegetables, fruits, milk products, meat/meat alternates, and other foods). Tables 4a, 4b, and 4c list the pounds per week of the 25 food categories in the market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans for each of the 12 age-gender groups. For children ages 1 and 2, the model yielded quantities of lower fat and skim milk and lowfat yogurt. Dietary guidance, however, is that children at these ages need to consume whole-milk products (American Academy of Pediatrics, 1992), so quantities of lower fat and skim milk and lowfat yogurt for these children were allocated to the category consisting of whole milk, yogurt, and cream. This procedure parallels the revision of the market baskets of the Thrifty Food Plan. Individual market baskets calculated for each age-gender group may be combined to calculate an overall household market basket.

Average Market Basket for Each Food Plan

To examine how the market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans differ from each other, CNPP calculated an average market basket for each plan. Average baskets were derived by weighting each age-gender group by its population size (according to the 1990 Census) and calculating a weighted mean for each food plan. Table 5 shows these average food plan market baskets (in pounds per week per person).⁷ The total amount of food in each average market basket increases, from that in the Low-Cost to the Moderate-Cost and to the Liberal Food Plan. The primary reason for this is related to increases in food-waste factors in the more expensive food plans; the waste factor was 10 percent for the Low-Cost Plan, compared with 30 percent for the Liberal Plan. Although CNPP assumed proportionate food waste across food categories, such waste is probably disproportionate. However, given the absence of complete data on food waste by food category, CNPP assumed proportionate waste across food categories.

Quantities of food for each of the Pyramid food groups also increase across the food plans, with the exception of the “other” food group (fats, oils, and sweets). For the “other” group, the Low-Cost Plan contains slightly higher quantities than does the Liberal Plan. Because the “other” food group is an inexpensive source of calories, it is more prominent in the Low-Cost Plan. This also represents the taste preferences of the average person who consumes a low-cost diet. Although containing more of these “other” foods, the Low-Cost Plan still meets all the dietary standards, including serving requirements of the Pyramid that were used in this revision.

Quantities differ in each of the 25 food categories in the average market baskets of the three food plans, but these differing patterns are for a weighted average market basket and may not hold for a specific age-gender group. These differences reflect two things: First, as the plans increase in cost, more options are available to the optimization program. The plans that cost more represent more variety. Second, because the plans reflect the diets of individuals consuming foods at different cost levels, those who spend more on food are likely choosing foods that are more costly. The following are some of the more noticeable differences among food groups:

Grains

The amount of breakfast cereals in the Low-Cost Food Plan is greater than the amount in the other two food plans. The amount of breads also increases as the cost of the food plans rises.

⁷Components of the three market baskets are discussed in terms of pounds; therefore, fluids such as milk and soft drinks are weighted more prominently than are dry foods, and juice concentrates are weighted less prominently than are their reconstituted forms.

Table 3. Food categories and examples of foods in the market baskets: Low-Cost, Moderate-Cost, and Liberal Food Plans

Food category	Examples of foods
Grains	
Breads, yeast and quick	Rolls, buns, breads, muffins, biscuits, flour or corn tortillas, taco shells, bagels, waffles, pancakes, doughnuts, bread stuffing, bread crumbs, and croutons
Breakfast cereals, cooked and ready to eat	Corn grits, cream of wheat, cream of rice, oats, ralston, wheatena, all ready-to-eat cereals, and bulgur
Rice and pasta	All types of rice, spaghetti, noodles, and macaroni
Flours	Buckwheat flour, corn flour, corn meal, corn starch, oat bran, oat flour, rice flour, rye flour, wheat flours, cake mixes, cornbread mixes, pancake mixes, and tapioca flour
Grain-based snacks and cookies	Corn-based snacks, popcorn, pretzels, cookies, crackers, breakfast tarts, and breakfast bars
Vegetables	
Potato products	Potatoes, potato puffs, french-fried potatoes, potato chips, potato sticks, instant potato soup mixes, and instant mashed potatoes
Dark-green and deep-yellow vegetables	Broccoli, carrots, chard, collards, endive, kale, greens, pumpkin, spinach, sweet potatoes, yams, and carrot juice
Other vegetables	Asparagus, beans, beets, Brussels sprouts, cabbage, cauliflower, celery, sweet corn, cucumber, eggplants, lettuce, mushrooms, okra, onions, green peas, peppers, radishes, tomatoes and tomato products, squash, taro, mixed vegetables, and vegetable soups
Fruits	
Citrus fruits, melons, berries, and juices	Limes, lemons, grapefruits, oranges, and tangelos; melons such as cantaloupe, honeydew, and watermelon; berries such as blackberries, blueberries, cranberries, raspberries, and strawberries; and juices from these fruits
Noncitrus fruits and juices	All noncitrus fruits such as apples, apricots, bananas, cherries, grapes, papayas, peaches, pears, and plums; and their juices
Milk products	
Whole milk, yogurt, and cream	All fluid, evaporated, condensed, and dry whole milk; regular yogurt; all fluid creams; sour creams; cream cheeses; cream soups; and milk substitutes
Lower fat and skim milk and lowfat yogurt	All fluid, evaporated, and dry reduced-fat and skim milks; lowfat and nonfat yogurt; and fluid and dry buttermilk
Cheeses	Natural, processed, and imitation cheeses, cottage cheese, cheese spreads, cheese dips, and cheese soups
Milk drinks and milk desserts	Milk-based drinks such as malted milk, milk shakes, and eggnogs; chocolate or cocoa-based drinks, infant formulas, and meal replacement drinks; nondairy dessert toppings; and desserts such as ice cream, frozen yogurt, fudgesicle, sherberts, puddings, and custards

Continued

Table 3. Food category and examples of foods in the market baskets: Low-Cost, Moderate-Cost, and Liberal Food Plans (cont'd)

Food category	Examples of foods
Meat/meat alternates	
Beef, pork, veal, lamb, and game	Beef, pork, veal, lamb, game meats, organ meats, meat-based soups, meat-based baby foods, cured meat products, and processed meat products
Chicken, turkey, and game birds	Chicken, turkey, duck, game birds, organ meats, chicken- or turkey-based soups, chicken- or turkey-based rolls, and canned chicken
Fish and fish products	Finfish, shellfish, fish chowders, and reconstructed seafoods
Bacon, sausages, and luncheon meats	Bacon, sausages, salami, frankfurters, bologna, pastrami, corned beef, turkey ham, and luncheon meats
Eggs and egg mixtures	Fresh, frozen, and dried eggs; egg substitutes; meringues; and egg mixtures
Dry beans, lentils, peas, and nuts	Black, lima, mung, pinto, red, white, navy, pink, and kidney beans; cowpeas; chickpeas; lentils; all tree nuts; peanuts; peanut butter; soybeans; soy flour; soy milk; soy protein isolate; and soybean-based meat substitutes
Other foods	
Table fats, oils, and salad dressings	Butter; margarine; vegetable oils such as corn oil, olive oil, palm oil, peanut oil, sunflower oil, safflower oil, and soybean oil; shortenings; butter blends; lard; salad oils; all types of salad dressings; and mayonnaise
Gravies, sauces, condiments, spices and salt	Gravies, soy sauce, barbecue sauce, duck sauce, white sauce, and other sauces; pickles, relishes, mustard, and olives; baking soda, salt, vinegar, and baker's yeast; and all spices
Fruit drinks, soft drinks, and ades	Fruit juice drinks, fruit juice cocktails, and fruit punches; cola- and pepper-type soft drinks, ginger ale, and root beer; ades, lemonades, limeades, nonalcoholic wines, club soda, cream sodas, and other sodas
Sugars, sweets, and candies	All types of sugars, sweeteners, and syrups such as honey, jams, jellies, marmalades, preserves, icings, gelatin desserts, marshmallow, fudge, all types of candies and chocolates, and chewing gum
Coffee and tea	Instant, ground, and fluid coffees and teas with or without caffeine and with or without sugar or sweeteners

Table 4a. Market baskets of the Low-Cost Food Plan, pounds of food per week,¹ by age-gender group

Food category	Children (years)			Females			Males			Females		Males
	1	2	3-5	6-8	9-11	12-19	12-14	15-19	20-50	20-50	51+	51+
<i>Pounds per week</i>												
Grains												
Breads, yeast and quick	0.26	0.48	0.86	1.27	1.28	1.44	1.17	2.16	1.33	1.21	1.22	1.20
Breakfast cereals, cooked and ready to eat	0.45	0.46	0.63	0.46	0.66	0.40	1.44	0.30	0.35	0.16	0.52	0.80
Rice and pasta	0.25	0.16	0.33	1.05	0.88	1.37	1.20	0.56	1.15	2.74	0.50	0.97
Flours	0.15	0.22	0.31	0.33	0.56	0.53	0.49	1.09	0.48	0.45	0.46	0.48
Grain-based snacks and cookies	0.06	0.09	0.25	0.18	0.27	0.09	0.19	0.21	0.14	0.14	0.15	0.15
Total Grains	1.17	1.40	2.37	3.29	3.65	3.83	4.49	4.32	3.51	4.71	2.85	3.59
Vegetables												
Potato products	1.33	1.26	1.52	2.91	2.67	2.50	1.42	6.18	1.54	4.09	1.05	1.55
Dark-green and deep-yellow vegetables	0.79	0.49	0.28	0.30	0.77	1.26	0.76	0.16	0.48	0.33	0.80	0.77
Other vegetables	0.47	0.97	0.92	1.75	2.06	1.96	3.37	1.69	3.34	2.69	3.17	3.43
Total Vegetables	2.59	2.72	2.72	4.96	5.50	5.71	5.54	8.03	5.36	7.12	5.01	5.75
Fruits												
Citrus fruits, melons, berries, and juices	0.16	0.16	0.47	0.99	1.50	1.08	2.60	3.95	2.05	4.46	1.75	2.72
Noncitrus fruits and juices	1.62	1.68	1.44	2.04	2.42	0.83	2.30	0.95	1.88	1.14	2.63	2.85
Total Fruits	1.78	1.84	1.91	3.03	3.92	1.91	4.89	4.90	3.92	5.60	4.38	5.56
Milk products												
Whole milk, yogurt, and cream	7.83	6.81	2.38	1.78	1.96	1.57	1.44	1.75	1.27	1.79	1.10	1.35
Lower fat and skim milk and lowfat yogurt	0.00	0.00	3.99	4.32	4.64	8.15	8.16	9.03	5.05	4.35	5.30	4.98
Cheese	0.17	0.26	0.31	0.24	0.29	0.37	0.29	0.34	0.29	0.34	0.23	0.29
Milk drinks and milk desserts	0.18	0.25	0.52	0.58	0.36	0.26	0.87	0.29	0.23	0.37	0.33	0.35
Total Milk products	8.18	7.32	7.20	6.91	7.25	10.34	10.75	11.40	6.84	6.85	6.96	6.97
Meat/meat alternates												
Beef, pork, veal, lamb, and game	1.19	1.02	0.69	1.30	1.95	1.29	1.17	1.50	1.39	1.91	1.24	1.66
Chicken, turkey, and game birds	0.59	0.40	0.60	1.17	1.19	1.85	2.54	1.00	1.84	1.50	1.79	1.98
Fish and fish products	0.03	0.32	0.09	0.30	0.17	0.66	0.62	0.90	0.61	0.39	0.62	0.47
Bacon, sausages, and luncheon meats	0.12	0.21	0.35	0.15	0.24	0.28	0.49	0.31	0.24	0.42	0.27	0.38
Eggs and egg mixtures	0.18	0.11	0.35	0.40	0.55	0.47	0.33	0.52	0.49	0.36	0.30	0.50
Dry beans, lentils, peas, and nuts	0.15	0.22	0.67	0.27	0.28	0.20	0.26	1.03	0.31	0.76	0.35	0.48
Total Meat/meat alternates	2.26	2.28	2.75	3.60	4.38	4.75	5.41	5.25	4.87	5.34	4.57	5.47
Other foods												
Table fats, oils, and salad dressings	0.12	0.17	0.20	0.27	0.30	0.31	0.38	0.49	0.38	0.53	0.37	0.42
Gravies, sauces, condiments, spices, and salt	0.11	0.07	0.12	0.16	0.16	0.11	0.25	0.23	0.22	0.33	0.21	0.23
Coffee and tea	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.03	0.03	0.15	0.31	0.25
Fruit drinks, soft drinks, and ades	1.60	3.02	3.64	3.87	4.87	5.07	5.02	6.02	6.65	4.84	4.04	2.85
Sugars, sweets, and candies	0.37	0.22	0.53	0.33	0.55	0.28	0.36	0.37	0.39	0.32	0.45	0.42
Total Other foods	2.18	3.48	4.49	4.64	5.89	5.78	7.13	8.00	6.17	5.38	4.17	

¹Food as purchased includes uncooked grain products; raw, canned, and frozen vegetables; fruit juice concentrates; fruit and legumes; meat with bones. Coffee and tea are in dried weight. Also, while fruit drinks, soft drinks, and ades may appear to be large in quantity for some adults, they typically translate to less than one 16-oz bottle of such drinks per day.

Table 4b. Market baskets of the Moderate-Cost Food Plan, pounds of food per week,¹ by age-gender group

Food category	Children (years)				Females				Males		Females	Males	Males
	1	2	3-5	6-8	9-11	12-19	12-14	15-19	20-50	20-50	51+	51+	51+
<i>Pounds per week</i>													
Grains													
Breads, yeast and quick	0.60	0.33	0.79	1.21	1.66	2.04	1.77	2.90	1.79	1.47	1.10	1.11	
Breakfast cereals, cooked and ready to eat	0.70	0.72	0.76	0.54	0.33	0.36	0.70	0.35	0.28	0.26	0.47	0.47	0.72
Rice and pasta	0.24	0.15	0.54	1.24	1.00	1.03	0.46	1.00	0.94	2.64	0.74	0.74	1.41
Flours	0.12	0.07	0.21	0.52	0.58	0.52	1.09	0.59	0.59	0.57	0.46	0.46	0.54
Grain-based snacks and cookies	0.13	0.12	0.24	0.28	0.27	0.18	0.30	0.15	0.24	0.26	0.14	0.14	0.21
Total Grains	1.79	1.38	2.55	3.78	3.83	4.13	4.31	5.00	3.84	5.20	2.91	3.99	
Vegetables													
Potato products	1.73	0.67	1.20	0.98	1.12	2.90	2.74	4.71	1.89	3.94	1.17	1.17	1.62
Dark-green and deep-yellow vegetables	0.44	0.79	0.25	1.29	1.40	0.60	0.22	0.47	0.70	0.56	1.04	1.04	1.05
Other vegetables	1.28	1.51	1.65	3.05	3.50	2.42	3.51	2.13	3.58	3.47	3.69	3.69	3.78
Total Vegetables	3.46	2.98	3.10	5.32	6.02	5.92	6.47	7.31	6.17	7.96	5.90	6.45	
Fruits													
Citrus fruits, melons, berries, and juices	0.32	0.83	0.62	0.75	1.21	2.35	3.43	2.84	2.15	4.49	2.44	2.44	2.55
Noncitrus fruits and juices	1.72	2.65	1.81	3.24	3.38	1.29	1.44	1.44	2.86	1.82	3.16	3.16	3.44
Total Fruits	2.05	3.48	2.43	3.98	3.59	3.63	4.88	4.28	5.00	6.31	5.60	5.99	
Milk products													
Whole milk, yogurt, and cream	8.07	8.09	3.57	1.70	2.04	1.58	2.26	2.20	1.31	1.74	1.19	1.19	1.52
Lower fat and skim milk and lowfat yogurt	0.00	0.00	3.37	5.10	5.31	9.79	8.95	9.06	5.32	4.57	5.68	5.68	5.12
Cheese	0.19	0.11	0.25	0.25	0.26	0.23	0.21	0.32	0.39	0.48	0.28	0.28	0.29
Milk drinks and milk desserts	0.25	0.30	0.72	0.77	0.49	0.34	0.46	0.55	0.32	0.41	0.34	0.34	0.29
Total Milk products	8.51	8.49	7.92	7.81	8.11	11.93	11.88	12.14	7.33	7.19	7.48	7.23	
Meat/meat alternates													
Beef, pork, veal, lamb, and game	0.67	0.48	1.05	0.94	1.52	1.50	1.61	2.24	1.59	2.04	1.49	1.49	2.18
Chicken, turkey, and game birds	0.43	1.03	1.39	2.33	1.16	2.72	2.82	1.87	2.06	2.01	2.41	2.41	1.97
Fish and fish products	0.06	0.00	0.10	0.95	1.21	0.16	0.24	0.32	1.07	1.07	0.72	0.72	0.54
Bacon, sausages, and luncheon meats	0.47	0.57	0.29	0.30	0.30	0.43	0.32	0.51	0.19	0.50	0.20	0.20	0.33
Eggs and egg mixtures	0.79	0.84	0.25	0.37	0.47	0.59	0.24	0.26	0.53	0.27	0.40	0.40	0.45
Dry beans, lentils, peas, nuts	0.09	0.40	0.28	0.20	0.29	0.27	0.34	1.06	0.23	0.76	0.30	0.30	0.58
Total Meat/meat alternates	2.52	3.33	3.38	5.09	4.95	5.67	5.58	6.27	5.68	6.65	5.52	6.07	
Other foods													
Table fats, oils and salad dressings	0.16	0.09	0.19	0.32	0.34	0.30	0.33	0.40	0.49	0.63	0.42	0.42	0.43
Gravies, sauces, condiments, spices, and salt	0.06	0.07	0.13	0.16	0.21	0.18	0.25	0.24	0.23	0.39	0.28	0.28	0.36
Coffee and tea	0.00	0.00	0.02	0.01	0.05	0.03	0.01	0.01	0.20	0.17	0.32	0.32	0.30
Fruit drinks, soft drinks, and ades	1.95	2.23	3.30	4.18	4.73	6.23	7.02	10.62	8.17	7.87	3.00	4.54	
Sugars, sweets, and candies	0.30	0.24	0.46	0.46	0.81	0.38	0.48	0.39	0.53	0.49	0.47	0.47	0.43
Total Other foods	2.48	2.62	4.10	5.13	6.13	7.11	8.09	11.65	9.62	9.54	4.48	6.05	

¹Food as purchased includes uncooked grain products; raw, canned, and frozen vegetables; fruit juice concentrates; dry beans and legumes; and meat with bones. Coffee and tea are in dried weight. Also, while fruit drinks, soft drinks, and ades may appear to be large in quantity for some adults, they typically translate to less than one 16-oz bottle of such drinks per day.

Table 4c. Market baskets of the Liberal Food Plan, pounds of food per week,¹ by age-gender group

Food Category	Children (years)				Males				Females			
	1	2	3-5	6-8	9-11	12-14	15-19	20-50	20-50	20-50	51+	Males Females
<i>Pounds per week</i>												
Grains												
Breads, yeast and quick	0.26	0.46	0.81	1.32	2.11	1.64	2.21	2.04	1.99	1.59	1.48	1.33
Breakfast cereals, cooked and ready to eat	0.75	0.53	0.72	0.37	0.75	0.22	0.45	0.26	0.41	0.26	0.34	0.46
Rice and pasta	0.34	0.27	1.20	1.62	0.97	0.93	1.49	2.08	0.94	2.94	0.83	2.27
Flours	0.12	0.15	0.25	0.46	0.37	0.91	0.60	0.84	0.62	0.72	0.57	0.39
Grain-based snacks and cookies	0.09	0.11	0.23	0.14	0.17	0.14	0.26	0.21	0.18	0.21	0.16	0.15
Total Grains	1.56	3.21	3.91	4.38	3.84	5.01	5.44	4.14	5.72	3.36	4.61	
Vegetables												
Potato products	1.08	1.08	1.25	1.48	1.30	3.26	2.04	5.20	1.68	4.72	1.41	2.36
Dark-green and deep-yellow vegetables	0.29	0.29	0.31	1.62	0.71	1.42	2.78	0.39	1.17	0.54	1.05	1.01
Other vegetables	1.71	2.85	1.79	2.99	4.33	2.12	2.98	2.90	4.00	3.46	4.42	3.85
Total Vegetables	3.07	4.22	3.36	6.08	6.34	6.80	8.49	8.85	8.71	6.89	7.22	
Fruits												
Citrus fruits, melons, berries, and juices	0.53	0.55	0.72	1.50	1.04	0.99	1.31	0.87	1.74	1.24	3.19	2.32
Noncitrus fruits and juices	3.56	2.40	2.00	2.86	4.04	4.77	3.44	9.01	3.80	7.64	3.02	4.55
Total Fruits	4.09	2.95	2.72	4.36	5.08	5.76	4.75	9.87	5.54	8.88	6.21	6.87
Milk products												
Whole milk, yogurt, and cream	8.50	9.15	2.53	1.69	1.74	1.99	1.81	2.62	1.43	2.07	0.83	1.38
Lower fat and skim milk, and lowfat yogurt	0.00	0.00	4.89	6.22	5.10	10.68	10.12	10.85	6.21	5.69	6.84	5.45
Cheese	0.14	0.07	0.26	0.16	0.22	0.23	0.30	0.30	0.30	0.39	0.22	0.28
Milk drinks and milk desserts	0.53	0.21	0.64	0.94	1.27	0.49	0.77	0.29	0.39	0.34	0.26	0.37
Total Milk products	9.17	9.43	8.31	9.00	8.33	13.39	13.00	14.06	8.34	8.50	8.15	7.47
Meat/meat alternates												
Beef, pork, veal, lamb, and game	0.85	1.16	1.40	2.10	1.81	2.28	2.57	3.38	2.48	3.56	2.07	2.34
Chicken, turkey, and game birds	0.63	1.09	1.29	2.32	1.38	1.67	1.97	1.92	2.28	1.53	2.34	1.86
Fish and fish products	0.14	0.08	0.59	0.42	2.52	0.64	0.69	0.09	1.41	0.69	1.57	1.47
Bacon, sausages, and luncheon meats	0.19	0.17	0.17	0.25	0.37	0.56	0.40	0.80	0.20	0.60	0.19	0.37
Eggs and egg mixtures	1.54	1.13	0.69	0.24	0.25	0.55	0.46	0.38	0.49	0.23	0.58	0.41
Dry beans, lentils, peas, and nuts	0.03	0.11	0.27	0.15	0.27	0.17	0.34	0.70	0.36	0.63	0.23	0.45
Total Meat/meat Alternates	3.38	3.73	4.41	5.47	6.62	5.87	5.42	7.26	7.23	7.23	6.98	6.90
Other foods												
Table fats, oils, and salad dressings	0.16	0.12	0.28	0.23	0.33	0.27	0.34	0.59	0.43	0.62	0.50	0.57
Gravies, sauces, condiments, spices, and salt	0.12	0.07	0.14	0.17	0.18	0.22	0.30	0.26	0.29	0.37	0.30	0.39
Coffee and tea	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.02	0.17	0.12	0.17	0.20
Fruit drinks, soft drinks, and ades	1.72	2.01	3.82	2.63	4.66	4.55	5.86	5.71	7.22	4.29	3.10	2.96
Sugars, sweets, and candies	0.13	0.46	0.50	0.53	0.43	0.30	0.56	0.41	0.56	0.41	0.35	0.39
Total Other foods	2.13	2.66	4.75	3.56	5.62	5.34	7.06	7.00	8.67	5.81	4.43	4.51

¹Food as purchased includes uncooked grain products; raw, canned, and frozen vegetables; fruit juice concentrates; dry beans and legumes; and meat with bones. Coffee and tea are in dried weight. Also, while fruit drinks, soft drinks, and ades may appear to be large in quantity for some adults, they typically translate to less than one 16-oz bottle of such drinks per day.

Table 5. Average market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans, pounds of food¹ per week

Food category	Low-cost	Moderate-cost	Liberal
<i>Pounds per week</i>			
Grains			
Breads, yeast and quick	1.25	1.48	1.61
Breakfast cereals, cooked and ready to eat	.44	.42	.39
Rice and pasta	1.33	1.33	1.62
Flours	.47	.53	.58
Grain-based snacks and cookies	.17	.22	.18
Total Grains	3.66	3.98	4.38
Vegetables			
Potato products	2.39	2.27	2.59
Dark-green and deep-yellow vegetables	.56	.77	.94
Other vegetables	2.73	3.29	3.57
Total Vegetables	5.68	6.33	7.10
Fruits			
Citrus fruits, melons, berries, and juices	2.48	2.61	1.68
Noncitrus fruits and juices	1.84	2.46	4.78
Total Fruits	4.32	5.07	6.46
Milk products			
Whole milk, yogurt, and cream	1.69	1.86	1.87
Lower fat and skim milk and lowfat yogurt	5.03	5.33	6.27
Cheese	.30	.34	.29
Milk drinks and milk desserts	.34	.39	.44
Total Milk products	7.36	7.92	8.87
Meat/meat alternates			
Beef, pork, veal, lamb, and game	1.50	1.68	2.55
Chicken, turkey, and game birds	1.60	2.02	1.87
Fish and fish products	.48	.80	1.10
Bacon, sausages, and luncheon meats	.31	.33	.37
Eggs and egg mixtures	.41	.42	.44
Dry beans, lentils, peas, and nuts	.47	.44	.39
Total Meat/meat alternates	4.77	5.69	6.72
Other foods			
Table fats, oils, and salad dressings	.39	.45	.47
Gravies, sauces, condiments, spices, and salt	.23	.27	.29
Fruit drinks, soft drinks, and ades	4.84	3.82	4.64
Sugars, sweets, and candies	.39	.17	.44
Coffee and tea	.19	.17	.12
Total Other foods	6.04	4.88	5.96
Total pounds	31.83	33.87	39.49

¹Food as purchased includes uncooked grain products; raw, canned, and frozen vegetables; fruit juice concentrates; dry beans and legumes; and meat with bones. Coffee and tea are in dried weight. Also, while fruit drinks, soft drinks, and ades may appear to be large in quantity for some adults, they typically translate to less than one 16-oz bottle of such drinks per day.

Vegetables

Dark-green and deep-yellow vegetables, as well as other vegetables, increase in quantity across the food plans. These two vegetable categories are relatively expensive, compared with potatoes, so they increase in amount as the cost of the food plans rises.

Fruits

More citrus fruits, melons, berries, and juices are in the Low-Cost Food Plan than are in the Liberal Food Plan; whereas, the amount of noncitrus fruits and juices are nearly three times higher in the Liberal Food Plan, compared with the Low-Cost Food Plan. Analysis of consumers' intake that was used as the basis for the Low-Cost Food Plan suggests that orange juice made from concentrate constitutes the bulk of the citrus fruits, melons, and berries group. Noncitrus fruits and juices are generally more expensive than orange juice, so they increase in quantity as the food plans rise in cost. Consequently, the quantity of citrus fruits, melons, berries, and juices generally decreases as the cost of the food plans increases. Thus, items such as orange juice are replaced by a greater variety of fruit.

Milk Products

Lower fat and skim milk and lowfat yogurt increase in quantity across the three food plans. The amount of milk drinks and milk desserts also increases across the food plans. Both increases are likely the result of taste preferences and economic considerations.

Meat/Meat Alternates

More expensive meat/meat alternates increase in quantity across the three food plans, resulting in the amount of beef, pork, veal, lamb, and game, and fish and fish products being greatest in the Liberal Food Plan. Less expensive meat/meat alternates generally decrease in quantity across the food plans: The amount of dry beans, lentils, peas, and nuts is smallest in the Liberal Food Plan, and the quantity of chicken, turkey, and game birds is smaller in the Liberal Food Plan than in the Moderate-Cost Food Plan.

Other Foods

Greater amounts of fruit drinks, soft drinks, and ades are in the Low-Cost Food Plan than are in the other two food plans. Greater amounts of sugars, sweets, and candies are in the Low-Cost Food Plan than are in the Moderate-Cost Food Plan. Food categories in "other" foods are inexpensive sources of calories and fat. So, after dietary standards are met, the amounts of these food categories increase in the less expensive food plans because of consumer preference.

Average Food Plan Market Baskets vs. Average Consumption and Previous Market Baskets

To understand how actual reported diets would need to change to meet the dietary standards of the revised Low-Cost, Moderate-Cost, and Liberal Food Plans, we can compare the average market basket (in pounds per week) for each plan with people's average consumption (in pounds per week) based on the food expenditure quartile corresponding to each plan. Using the same technique that produced the average market basket, CNPP calculated an average consumption basket. Table 6 shows the percentage difference between the average market basket for each plan and the average consumption basket for people in the corresponding food expenditure quartile. The following are some of the more noticeable differences:

Grains

The market baskets of all three food plans contain more breakfast cereals and rice and pasta than do the consumption baskets. The Liberal Food Plan contains 264 percent more rice and pasta than does a market basket based on people's consumption pattern, as reflected in the highest quartile of food spending. The main reason for the high number is that the average individual in the highest quartile of food spending consumed only .45 pounds of pasta and rice (not shown), compared with 1.62 pounds (table 5) in the plan. Similarly, for the Moderate-Cost Food Plan, the average person consumed .42 pounds (not shown), compared with 1.33 pounds; for the Low-Cost Food Plan, the average person consumed .45 pounds (not shown), compared with 1.33 pounds recommended by the plan. The market basket of the Low-Cost Food Plan contains slightly fewer pounds of bread and flours than does the market basket based on people's consumption patterns, as reflected in the second lower quartile of food spending. The market baskets of all three plans contain fewer grain-based snacks and cookies than do the baskets based on consumption.

Vegetables

The market baskets of all three plans contain more vegetables than do the market baskets based on consumption. This is not surprising, because the market baskets of the food plans represent a nutritious diet at various cost levels—and the consumption of vegetables generally needs to increase (Basiotis et al., 2002).

Fruits

The market baskets of all three plans contain more fruit than do the market baskets based on consumption. The Low-Cost Food Plan contains 242 percent more citrus fruits, melons, berries, and juices than does a market basket based on people's consumption pattern, as reflected in the second lowest quartile of food spending. As was the case with vegetables, this also is not surprising because the market baskets of the food plans represent a nutritious diet at various cost levels—and because most Americans need to eat more fruit (Basiotis et al., 2002).

Table 6. Average market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans versus corresponding average consumption, percentage difference

Food category ¹	Low-cost	Moderate-cost	Liberal
<i>Percent difference¹</i>			
Grains			
Breads, yeast and quick	-2.7	22.1	59.9
Breakfast cereals, cooked and ready to eat	24.2	23.6	16.8
Rice and pasta	199.2	214.7	264.1
Flours	-15.7	2.0	14.6
Grain-based snacks and cookies	-32.9	-26.9	-36.7
Vegetables			
Potato products	105.4	93.6	112.6
Dark-green and deep-yellow vegetables	30.6	42.1	66.1
Other vegetables	0.2	10.6	11.7
Fruits			
Citrus fruits, melons, berries, and juices	241.6	183.6	50.9
Noncitrus fruits and juices	48.7	60.3	203.6
Milk products			
Whole milk, yogurt, and cream	-21.0	-11.4	-12.1
Lower fat and skim milk and lowfat yogurt	81.5	83.7	157.1
Cheese	-37.5	-30.3	-39.2
Milk drinks and milk desserts	-34.4	-28.4	-32.8
Meat/meat alternates			
Beef, pork, veal, lamb, and game	1.1	-4.2	-1.4
Chicken, turkey, and game birds	5.8	38.6	21.1
Fish and fish products	61.1	134.8	148.9
Bacon, sausages, and luncheon meats	-20.2	-8.2	27.6
Eggs and egg mixtures	-22.5	-13.3	-0.3
Dry beans, lentils, peas, and nuts	19.4	32.2	14.1
Other foods			
Table fats, oils, and salad dressings	-21.3	-17.1	-15.4
Gravies, sauces, condiments, spices, and salt	-21.1	-15.5	-21.3
Fruit drinks, soft drinks, and ades	-26.0	-38.4	-13.0
Sugars, sweets, and candies	-27.8	-67.2	-19.7
Coffee and tea	-22.1	-7.6	-19.3

¹These percentages may not match text because of rounding.

Milk Products

The market basket of each food plan contains fewer pounds of whole milk, yogurt, and cream; cheese; and milk drinks and milk desserts than do the market baskets based on consumption. On the other hand, each plan's market basket contains more lower fat and skim milk and lowfat yogurt than do the market baskets based on consumption. The market baskets of all three food plans provide calcium and protein from lower fat milk products while reducing the total fat and saturated fat available from these foods.

Meat/Meat Alternates

The market basket of each food plan contains more chicken, turkey, and game birds; fish and fish products; and dry beans, lentils, peas, and nuts than is the case for the market baskets based on consumption. Each food plan's market basket also contains nearly the same or fewer pounds of beef, pork, veal, lamb, and game, as well as eggs and egg mixtures, than do the market baskets based on consumption. The three food plans have meat/meat alternate components that are relatively lower in fat. The 28-percent increase in bacon, sausages, and luncheon meats in the Liberal market basket, compared with the average consumption basket, represents a rise from .29 to .37 pounds. The optimization model recommends low-fat luncheon meats and sausages rather than regular-fat varieties.

Other Foods

The market baskets of the three food plans contain fewer pounds of "other" foods (fats, oils, and sweets) than do the market baskets based on consumption. Foods in this group are typically high in fat and calories and are not nutrient dense (hence their placement at the tip of the Food Pyramid), so they represent a smaller share of nutritious market baskets based on the plans than market baskets based on average consumption.

New and Previous Food Plans and Dietary Guidance

CNPP also compared the average market basket of the new and previous Low-Cost, Moderate-Cost, and Liberal Food Plans. Such a comparison shows how dietary guidance has changed over time (Table 7). New and previous market baskets represent an unweighted average for pounds of foods per week for all age-gender groups. Compared with their respective previous market baskets, the new market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans contain fewer pounds of grains (16 to 20 percent less), more vegetables (6 to 15 percent more), more fruits (35 to 38 percent more), and slightly more meat/meat alternates (5 to 7 percent more). The new market baskets of the Low-Cost and Moderate-Cost Food Plans contain slightly fewer pounds of milk products, compared with the previous markets baskets (3 to 4 percent less); whereas, the new market basket of the Liberal Food Plan contains slightly more milk products

Table 7. Average revised market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans versus average previous market baskets, in pounds of food per week¹

	Low-cost market basket			Moderate-cost market basket			Liberal market basket		
	Previous	Revised	Difference	Previous	Revised	Difference	Previous	Revised	Difference
	<i>Pounds</i>			<i>Pounds</i>			<i>Pounds</i>		
Grains	4.11	3.27	-20%	4.29	3.56	-17%	4.63	3.89	-16%
Vegetables	4.40	5.08	+15%	5.28	5.59	+6%	5.78	6.32	+9%
Fruits	3.75	5.16	+38%	4.54	6.11	+35%	5.21	7.12	+37%
Milk products	8.35	8.08	-3%	9.25	8.84	-4%	9.45	9.76	+3%
Meat/meat alternates	4.04	4.24	+5%	4.84	5.06	+5%	5.50	5.88	+7%
Other foods (fats, oils, and sweets)	*3.74	5.28	—	*4.03	6.42	—	*4.69	5.13	—
Total	28.39	31.11		32.23	35.58		35.26	38.11	

¹Figures are an unweighted average in terms of pounds of food per week for all age-gender groups.

*Does not contain added fats, oils, and sugars. These items are included in the food groups to which they apply; therefore, no meaningful comparisons can be made.

(3 percent more) than its previous market basket. These percentage changes from the previous market baskets are likely distorted, because for the previous baskets, added fats, oils, and sugars were allocated to their respective food group component (e.g., fats added to vegetables were allocated to the vegetable category). Thus, for vegetables, fruits, and meat/meat alternates, the percentage changes from the previous to the new market baskets are likely underestimates; whereas, for grains, the percentage changes are likely overestimates. For milk products, the percentage change is likely an underestimate for the Liberal Food Plan and overestimates for the other two food plans.

The smaller amount of grains and larger amounts of vegetables and fruits in each of the new market baskets, versus previous market baskets, likely reflects the requirement that the new market baskets meet the serving recommendations of the *Food Guide Pyramid*. The previous baskets did not meet such recommendations. A true comparison of the “other” foods category (fats, oils, and sweets) cannot be made between the previous and revised market baskets because the “other” category in the previous baskets does not contain added fats, oils, and sugars as a separate group; whereas, it does for the new baskets.

It is important to note the larger quantity of food (measured in pounds per week) in the revised market baskets of the food plans, compared with the previous ones. This partly reflects changes in dietary guidance. For example, the previous food plans allowed for up to 35 percent of calories from fat; whereas, the revised food plans allowed for up to 30 percent of calories from fat. This translates to higher food weight (pounds). All three revised food plans provide the REA for each age-gender group.

Cost Update of the Low-Cost, Moderate-Cost, and Liberal Food Plans

The cost of the revised market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans will be updated each month for each of the 12 age-gender groups by the same method currently used. This method, approved in 1998 by an expert interagency panel of economists, uses the monthly CPIs for specific food categories to update prices of the market baskets. Each of the 25 food categories of the food plans has a corresponding CPI or a set of corresponding CPIs that are used to update the cost of the appropriate food category for each age-gender group's market basket. For food categories with more than one corresponding CPI, CNPP uses a weighted average of the appropriate CPIs. For example, the CPI for breakfast cereal is used to update the cost of the food category "breakfast cereals, cooked and ready to eat." The CPI for potatoes is used to update the food category "all potato products," the CPI for cheese and related products is used to update the food category "cheese," and the food category "chicken, turkey, and game birds" is updated with the CPI for poultry. CNPP uses a weighted average of the CPI for fresh milk (other than whole) and the CPI for other dairy and related products to update the cost of "lower fat and skim milk and lowfat yogurt." The weights are based on expenditure patterns. After the CPIs are applied to each food category, the costs of the food categories are summed to determine the total cost of the market basket of the food plan for each age-gender group. This procedure is different from using the overall CPI for food at home to update food costs because the overall CPI for food at home reflects a market basket based on average consumption; whereas, the updates reflect nutritious market baskets at three cost levels.

Conclusions

The revised market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans successfully incorporate recent dietary guidance and nutrient recommendations and maintain constant real-cost levels. The market baskets serve as a valuable framework for providing advice to households regarding nutritious food selection at various cost levels. This is especially important because most people have a diet that needs improvement (Basiotis et al., 2002). This revision of the market baskets of the Low-Cost, Moderate-Cost, and Liberal Food Plans is an important step in helping households eat more healthfully.

References

- American Academy of Pediatrics, Committee on Nutrition. (1992). Statement on cholesterol. *Pediatrics*, 90, 469-473.
- Basiotis, P.P., Carlson, A., Gerrior, S.A., Juan, W.Y., & Lino, M. (2002). *The Healthy Eating Index: 1999-2000*. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. CNPP-12.
- Basiotis, P.P., Welsh, S.O., Cronin, F.J., Kelsey, J.L., & Mertz, W. (1987). Number of days of food intake records required to estimate individual and group nutrient intakes with defined confidence. *The Journal of Nutrition*, 117(9), 1638-1641.
- Bowman, S.A. (1997). A methodology to price foods consumed: Development of a food price database. *Family Economics and Nutrition Review*, 10(1), 26-33.
- Cleveland, L.E., & Peterkin, B.B. (1983). USDA 1983 Family food plans. *Family Economics and Nutrition Review*, 2, 12-21.
- Cofer, E., Grossman, E., & Clark, F. (1962). Family food plans and food costs. *Home Economics Research Report No. 20*. U.S. Department of Agriculture, Agricultural Research Service.
- Lino, M. (2002). *Expenditures on Children by Families, 2001 Annual Report*. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, Miscellaneous Publication No. 1528-2001.
- National Academy of Sciences, National Research Council, Food and Nutrition Board. (1989a). *Diet and Health: Implications for Reducing Chronic Disease Risk*. Washington, DC: National Academy Press.
- National Academy of Sciences, National Research Council, Food and Nutrition Board. (1989b). *Recommended Dietary Allowances* (10th ed.). Washington, DC: National Academy Press.
- U.S. Department of Agriculture. (1996). *The Food Guide Pyramid*. Home and Garden Bulletin No. 252. Washington, DC: U.S. Government Printing Office.
- U.S. Department of Agriculture, Agricultural Research Service. (1975). *Food Yields: Summarized by Different Stages of Preparation*. Agriculture Handbook No. 102.
- U.S. Department of Agriculture, Agricultural Research Service. (1976-1992). *Composition of Foods*. Agricultural Handbook No. 8 (1-21) and Supplements.
- U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. (1999). *The Thrifty Food Plan, 1999 Administrative Report*. CNPP-7.

U.S. Department of Agriculture, Human Nutrition Information Service. (1983a). *The Thrifty Food Plan, 1983*. CND(Adm.) No. 365.

U.S. Department of Agriculture, Human Nutrition Information Service. (1983b). *Measures of Food Used and Food Eaten in U.S. Households*. CND(Adm.) No. 369.

U.S. Department of Agriculture, Human Nutrition Information Service. (1983c). *USDA Family Food Plans, 1983*. CND(Adm.) No. 366.

U.S. Department of Agriculture and U.S. Department of Health and Human Services. (1995). *Nutrition and Your Health: Dietary Guidelines for Americans* (4th ed.). Home and Garden Bulletin No. 232. Washington, DC: U.S. Government Printing Office.

U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2000). *Nutrition and Your Health: Dietary Guidelines for Americans* (5th ed.). Home and Garden Bulletin No. 232. Washington, DC: U.S. Government Printing Office.



Appendix 1

A Methodology to Price Foods Consumed: Development of a Food Price Database

Shanthy A. Bowman
Food Scientist
Center for Nutrition Policy and Promotion

Information on what people eat and how much money they spend on the foods they eat is useful when studying the cost of nutritious diets. USDA's Continuing Survey of Food Intakes by Individuals is a major source of information on food consumed by Americans. However, this survey lacks information about the cost of individual food items that are reported consumed by individuals. A methodology was developed to estimate the prices of foods as consumed in the survey: (1) The foods were disaggregated into their recipe ingredients; (2) the recipe ingredients were converted to a form that could be purchased; (3) the ingredients were priced; and (4) the ingredients were aggregated back to foods—with prices.



The Continuing Survey of Food Intakes by Individuals (CSFII 1989-91), conducted by the U.S. Department of Agriculture (USDA), has information on the kinds and amounts of foods reported consumed by individuals. However, information on the cost of individual food items purchased and brought into homes is not available in this survey. Therefore, it is not possible to estimate how much individuals spend on foods they consume from the survey data alone. This article describes the methodology that was developed to estimate the prices of foods as reported consumed in the survey and the Food Price Database that resulted.

Sources of Data

The process of food price database development involved the identification of foods reported consumed in the CSFII 1989-91 survey and their recipe ingredients, conversion of recipe ingredients to the form in which they can be purchased, pricing of recipe ingredients, and converting the recipe ingredients with prices to foods reported consumed with prices. Various data sources were used in the different steps of developing the database; these are listed on the opposite page.

Identification of foods reported consumed and their recipe ingredients.

- USDA Continuing Survey of Food Intakes by Individuals 1989-91—“Record Type 30” (4). This file lists individual foods reported consumed in the survey. Food intake data were obtained for individuals age 1 year and older.
- USDA Continuing Survey of Food Intakes by Individuals 1989-91—“Survey Recipe File” (5). This file contains recipes for all the foods reported consumed in the survey. Each food is identified by a 7-digit food code. Table 1 gives some of the information from the survey recipe file for chili con carne with beans and potato salad with egg. Only those recipes for the foods reported consumed on the first day of the survey by individuals age 1 year and older were used.

Conversion of recipe ingredients to the forms in which they can be purchased.

- USDA Agriculture Handbook No. 102—“Food Yields Summarized by Different Stages of Preparation” (2). This publication contains the percent yield of foods. For example, it was used to compute the percent of edible portion of a vegetable after it is peeled and percent yield of some cooked foods.
- USDA Agriculture Handbook No. 8 (series)—“Composition of Foods” (3). Information from Handbook No. 8 was used to compute the weight of uncooked foods such as pasta, rice, meat, and vegetables from the respective cooked weights.

Table 1. Recipes for chili con carne with beans and potato salad with egg

Survey food code	Ingredient description	Amount in 100 grams of recipe
Food: Chili con carne with beans		
2711141	Ground beef, cooked	20.92
2711141	Onion, raw	6.76
2711141	Celery, raw	3.69
2711141	Chili powder	.32
2711141	Salt	.34
2711141	Tomatoes, stewed	27.89
2711141	Tomato sauce	13.94
2711141	Kidney beans, canned	26.14
Food: Potato salad with egg		
7160101	Mayonnaise	8.12
7160101	Dry mustard	.24
7160101	Salt	.61
7160101	Onion, chopped	1.48
7160101	Green pepper, chopped	1.30
7160101	Celery, chopped	6.64
7160101	Sweet pickle relish	2.95
7160101	Pimento, canned	1.14
7160101	Potatoes, boiled, diced	66.45
7160101	Eggs, hard cooked, diced	11.07

- USDA Continuing Survey of Food Intakes by Individuals 1989-91—“Survey Food Code Book” (6). The survey food code book has gram weights for different measures such as cups, fluid ounces, slices, and units. This file was mainly used to convert fluid ounces to gram weight equivalents for foods such as milk, fruit juices, juice drinks, and salad dressings. The gram weight of measures for some of the foods are in table 2, p. 28.

Pricing of food ingredients.

- Average retail prices for the food ingredients were assigned by USDA’s Economic Research Service (ERS) (7). ERS used the following price sources to compute the food prices: Scantrack® system developed by A.C. Nielsen; Bureau of Labor Statistics (BLS), U.S. Department of Labor; Agricultural Marketing Service (AMS), USDA; and National Marine and Fisheries Service (NMFS), U.S. Department of Commerce.

Table 2. Food codes, their descriptions, measures, and weights

Survey food code	Food code description	Measure	Gram weight equivalent
1111100	Milk, cow's, fluid, whole	1 cup 1 fl oz	244 30.5
8310100	Blue or roquefort cheese dressing	1 cup 1 tbsp	245 15.3
8210200	Corn oil	1 cup 1 tbsp	218 13.6
8310710	Mayonnaise, made with yogurt	1 cup 1 tbsp	220 13.8
9241031	Soft drink, cola-type	1 fl oz 1 can (12 fl oz)	31 369
9241061	Ginger ale	1 fl oz 1 can (12 fl oz)	30 366
9251015	Apple juice drink	1 cup 1 fl oz	250 31.3
9251061	Fruit drink (includes fruit punches and fruit ades)	1 cup (8 fl oz) 1 fl oz	248 31.0

BLS collects a representative sample of retail prices in 85 urban areas throughout the Nation. Although the BLS prices are considered the best source of representative prices, they include only a limited number of foods.

The Scantrack® system has information on all scannable products in grocery stores having annual sales of at least \$2 million, which account for about 82 percent of all grocery sales. It provides such information as brand names and container sizes. AMS prices were used to compute the prices of fresh fruits and vegetables that were not available in the BLS and the Scantrack® databases. Data from NMFS were used to compute the prices of fresh fish and fish products that were not available in the BLS and the Scantrack® databases (1).

Methodology

Identification of Foods Reported Consumed and Their Recipe Ingredients

Foods reported consumed in the CSFII 1989-91 by individuals age 1 year and older were identified from the Record Type 30. Alcoholic beverages were not included because they are not a part of the Food Guide Pyramid food groups.

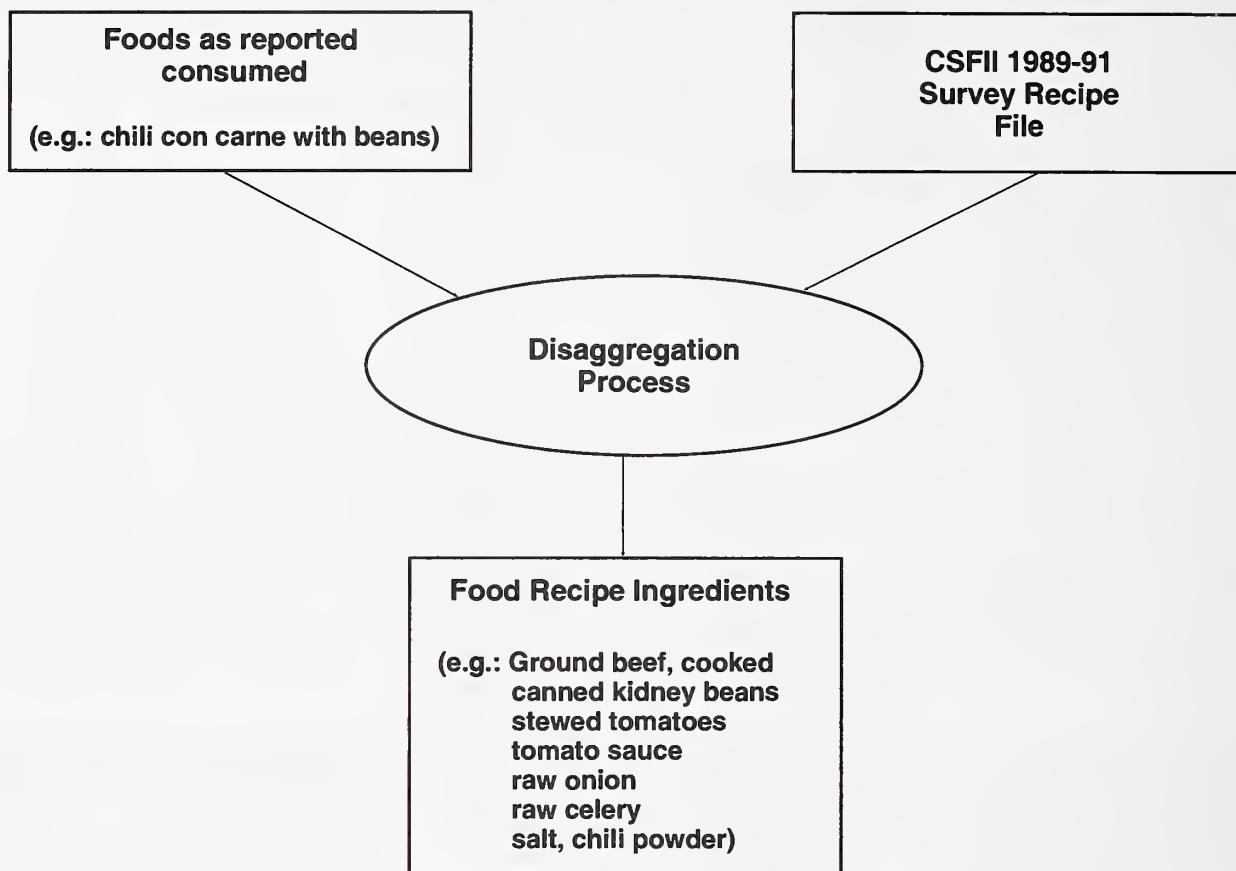
Recipes for the foods reported consumed were extracted from the CSFII 1989-91 survey recipe file. The names of the recipe ingredients, their amounts in the recipe, and the yield of the recipe were used to estimate prices of the foods reported consumed. Recipe ingredients were identified through a disaggregation process. Figure 1 shows the disaggregation of chili con carne with beans.

Establishing the "Purchased" Form of Recipe Ingredients

Recipe ingredients that could be purchased in the form used in the recipes were separated from the other ingredients. These were ready for pricing. Most ingredients were in this form. Examples of such foods are milk, yogurt, cheese, butter, cream, breads, muffin, flour, ready-to-serve soups, baby foods, oils, salad dressings, soft drinks, ready-to-eat cereals, cookies, crackers, candies, luncheon meats, sausages, salt, and spices.

A recipe where all ingredients could be directly purchased is given in table 3, p. 30. The dry potato flakes, milk, margarine, and salt in the recipe for mashed potatoes may be purchased in the form required by the recipe. Recipe ingredients such as cooked rice, cooked pasta,

Figure 1. Disaggregation of foods reported consumed to recipe ingredients



boiled eggs, and steamed vegetables that could not be purchased in the form used in the recipes were converted back to the weight equivalents of the form in which they can be purchased, using conversion factors. A process to decide the need for conversion factors is shown in figure 2, p. 31.

Development of Conversion Factors
 Two types of conversion factors were used: to adjust for cooking loss or gain and to adjust for food preparation waste. The first conversion factor adjusted for the loss or gain in weight

due to cooking. For example, steamed vegetables were converted to raw, prepared forms; and cooked rice and cooked pasta were converted to their respective uncooked forms. Some examples of this type of conversion—from cooked to raw forms—are shown in table 4, p. 30. By using a conversion factor, 100 grams of cooked rice was converted to 35.4 grams of uncooked rice by weight and assigned the price of this quantity of uncooked rice. In the same way, 100 grams of toasted white bread was assigned the price of 111 grams of fresh white bread.

The second conversion factor adjusted for waste in food preparation. This factor converted peeled raw potatoes to potatoes with peel and raw eggs to shell eggs. Examples of how the food preparation loss factor is used are given in table 5, p. 30. One-hundred grams of raw banana consumed is equivalent to 154 grams of raw banana with peel, and 100 grams of peeled, seeded, and sliced honeydew is equivalent to 217 grams of fresh whole honeydew. These fruits are priced as banana with peel and whole honeydew, respectively.

Some foods required conversion factors for both cooking weight changes and preparation waste. Foods such as fresh vegetables, eggs, meat cuts with bone and/or skin removed are first prepared to the form required for cooking and then cooked. Examples of foods that need both types of conversion factors are shown in table 6, p. 32.

Pricing of Food Ingredients

National average prices for the food ingredients in "purchased" form for the years 1989, 1990, and 1991 were computed by ERS based upon data from Scantrack®, BLS, AMS, and NMFS (7).

ERS categorized nearly one-half million items from Scantrack® to fit into the CSFII food descriptions. Summary information was entered on a spreadsheet and average prices were computed. ERS made adjustments to the wholesale prices of fresh fruits and vegetables obtained from the AMS to account for losses due to trimming, spoilage and other damage, and to include the marketing spread (difference between wholesale and retail price, including transportation costs) to get retail prices. NMFS has developed a model that uses fish supply data and wholesale value information to estimate retail prices of most frequently consumed fish and shellfish. Prices for less frequently consumed fish were estimated using prices for similar species (1).

The prices received from ERS were in dollar amounts per pound or per fluid ounce. It was necessary to convert pounds and fluid ounces to corresponding gram weights. The CSFII 1989-91 Survey Code Book and Survey Recipe File, together with supermarket product label information, were used to convert fluid ounces to gram weights. All food prices were then converted to prices per 100 grams of food.

Table 3. Example of a recipe where all the ingredients could be purchased

Food ingredient	Amount in 100 grams of recipe	Raw weight equivalent
<i>Grams</i>		
Food: Mashed potato made from potato flakes and milk		
Dry potato flakes	14.5	14.5
Whole milk	23.2	23.2
Margarine	5.4	5.4
Water	56.4	56.4
Salt	0.5	0.5

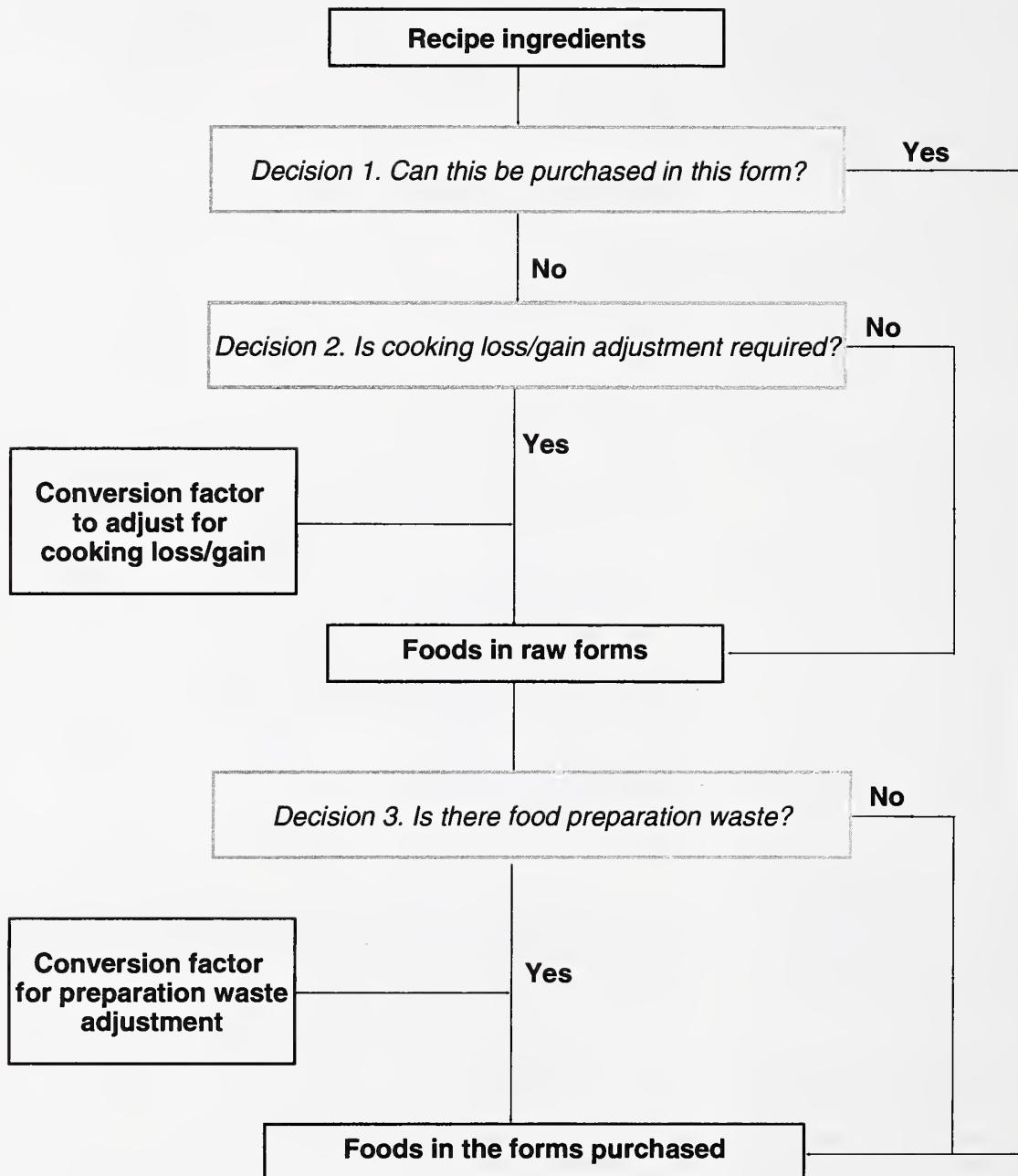
Table 4. Examples of foods that gain or lose weight during cooking

Food ingredient	Amount in 100 grams of recipe	Conversion factor	Raw weight equivalent
<i>Grams</i>			
Food: Cooked white rice, fat not added in cooking			
Enriched cooked rice	99.12	0.36	35.40
Salt	0.88	1.00	0.88
Food: White bread, toasted			
Toasted white bread	100.00	1.11	111.0

Table 5. Examples of foods that need adjustment for food preparation waste

Food ingredient	Amount in 100 grams of recipe	Conversion factor	Raw weight equivalent
<i>Grams</i>			
Food: Raw banana			
Raw banana, peeled	100	1.54	154
Food: Honeydew melon			
Honeydew melon, sliced	100	2.17	217

Figure 2. Decision process for establishing conversion factors



In the absence of food expenditure information, the Food Price Database offers a way to price the foods.

Table 6. Examples of foods that need two conversion factors

Food ingredient	Preparation waste conversion factor	Cooking gain/loss conversion factor
Cooked snap beans	1.14	1.11
Boiled carrots	1.12	1.03
Baked potato flesh	1.33	1.17
Boiled eggs	1.18	1.03
Roasted boneless chicken	1.49	1.19

Table 7. Creating foods with prices—price of 100 grams of scrambled eggs

Food ingredient	Raw equivalent in 100 gram recipe	Price of 100 gram ingredient	Price of recipe amount
	<i>Grams</i>	<i>Dollars</i>	<i>Dollars</i>
Raw eggs	87.57	\$0.16	\$0.140
Milk	31.64	0.06	0.019
Table fat	3.74	0.14	0.005
Salt	0.31	0.06	0
Total price of 100 grams of scrambled eggs = \$0.164			

Prices were obtained from ERS for about 1,600 foods. There were some foods in the survey for which ERS had no prices. The mean intake of these foods was very small in the survey. In these cases, average prices of similar types of foods that were available from ERS were used.

Estimation of Prices for CSFII 1989-91

The food ingredients were then aggregated back to foods in the form reported consumed in the CSFII. Each food had three prices—one for each year (1989, 1990, and 1991). Prices were computed for 100 grams of recipe. An example of how scrambled eggs is priced from its recipe ingredients is shown in table 7.

The final food price database contains 7-digit food codes for the foods and prices for 100 grams of each food for the years 1989, 1990, and 1991.

Uses of the Food Price Database

This database was developed to revise the current Thrifty Food Plan (TFP). The TFP is the lowest cost food plan developed by USDA and is the nutritional basis of U.S. Food Stamp Program benefits. The Food Stamp Program provides low-income households with the means to purchase low-cost, nutritious diets. In the current TFP, the cost of foods purchased by the low-income population was derived from the Household Survey data collected in

the 1977-78 Nationwide Food Consumption Survey. The CSFII 1989-91 did not collect household food use data. In the absence of food expenditure information, the Food Price Database offers a way to price the foods. The primary use of this database is to study the cost of nutritious diets such as the USDA food plans.

Acknowledgment

The author expresses appreciation to K. Marcoe and R. Powell of the Nutrition Promotion staff and members of the Nutrition Policy and Analysis staff of the Center for Nutrition Policy and Promotion for their assistance in data verification and technical support.

References

1. Lutz, S. 1996. U.S. Department of Agriculture, Economic Research Service. Unpublished data.
2. U.S. Department of Agriculture, Agricultural Research Service. 1975. *Food Yields Summarized by Different Stages of Preparation*. Agriculture Handbook No. 102.
3. U.S. Department of Agriculture, Agricultural Research Service. 1976-1992. *Composition of Foods*. Agriculture Handbook No. 8 (1-21) and Supplements.
4. U.S. Department of Agriculture, Agricultural Research Service. 1989-1991. Continuing Survey of Food Intakes by Individuals 1989-91 data.
5. U.S. Department of Agriculture, Agricultural Research Service. 1989-1991. Continuing Survey of Food Intakes by Individuals 1989-91 Survey Recipe File.
6. U.S. Department of Agriculture, Agricultural Research Service. 1989-1991. Continuing Survey of Food Intakes by Individuals 1989-91 Survey Food Code Book.
7. U.S. Department of Agriculture, Economic Research Service. 1995. Informational memorandum—Average retail prices for food items for 1989, 1990, and 1991.

Appendix 2

Documentation of the Food Group Database

Food categories developed for the revised Low-Cost, Moderate-Cost, and Liberal Food Plans are based mainly on the classification of the food categories used in the 1989-91 CSFII, with modifications suitable for models of the food plans. In addition, criteria used in previous development of the food plans and food groups of the *Food Guide Pyramid* were considered in grouping foods. Within major food categories, individual foods that had similar nutritive values (particularly fat content) were placed together in subcategories. The cost of the foods was also considered in grouping foods.

Foods reported as consumed by all individuals 1 year and older in the 1989-91 CSFII sample are grouped into 44 food categories. The food category database, consisting of 4,830 individual foods, excludes alcoholic beverages. Foods included in each category and criteria used to assign a food to a particular food category are described next.

Grains

Breads, yeast and quick—high fiber; Breads, yeast and quick—regular fiber: contains breads, rolls, muffins, bagels, tortillas, taco shells, pancakes, waffles, biscuits, and cornbread. This group is subdivided into two categories: high fiber and regular fiber. Breads or bread products with 0.8 grams or more of fiber per ounce were placed in the high-fiber category, and the remaining breads and bread products were placed in the regular-fiber category. This cutoff is based on CNPP's consensus of what a high-fiber bread is and on the Food and Drug Administration's (FDA) definition of a "good source of fiber."

Breakfast cereal—high fiber; Breakfast cereal—regular fiber: contains ready-to-eat cereals, cornmeal, oatmeal, millet, and grits. This group is subdivided into two categories—high fiber and regular fiber. Cereals with 1.2 grams or more of fiber per ounce and oatmeal cereals were placed in the high-fiber category. The remaining cereals were placed in the regular-fiber category. This cutoff is based on CNPP's consensus of what a high fiber cereal is and on the FDA's definition of a "good source of fiber."

Rice and pasta: contains all types of rice and pasta products, such as macaroni, noodles, and spaghetti.

Cakes, pies, and other sweet bakery products: contains cakes, cookies, pies, pastries, doughnuts, sweet rolls, croissants, graham crackers, breakfast and meal-replacement bars, and other sweet products.

Grain-based snacks: contains crackers, popcorn, pretzels, and corn- or wheat-based salty snacks.

Grain mixtures—regular fat; Grain mixtures—lowfat: contains tacos, enchiladas, chimichangas, pizzas, pasta with meat and/or vegetables, egg rolls, lasagna, and rice with meat and/or vegetables. This group is subdivided into two categories—regular fat and lowfat. Generally, mixtures were placed in the regular or lowfat category based on their CSFII descriptor. In some cases, a food code was reviewed and subsequently included in a particular category based on the fat content of the components of its recipe. Six percent was chosen as the cutoff value for regular versus lowfat by reviewing the fat content of fried or high-fat grain mixtures such as tacos, nachos, burritos, pizza, and pasta with cheese. Pizza without cheese contains 6.25 percent fat; rice dishes with beans, macaroni salads, meatless lasagna, and lo-mein with meat contain 4.5 to 6.0 percent fat. Because pizza is considered a higher fat food and those foods with a fat content of 4.5 to 6 percent are considered lower fat foods, CNPP placed mixtures with a fat content of less than 6.0 percent by weight in the lowfat category. CNPP placed mixtures with a fat content of 6.0 percent or more by weight in the regular-fat category.

Vegetables and Fruits

Potato products—high fat; Potato products—regular fat: contains fresh and processed white potatoes, french fries, hash browns, home fries, potato chips, and potato sticks. These foods are subdivided into two categories—high fat and regular fat. The high-fat category consisted of potato chips; french-fried potatoes; hash browns; potato puffs; potato patties; potato pancakes; potato puddings and salads; and mashed potatoes with added fat, egg, and cheese. The regular-fat category consisted of German-style potato salad and cooked, boiled, baked, scalloped, mashed, and stuffed potatoes.

Green-yellow vegetables—added fat; Green-yellow vegetables—no added fat: contains vegetables such as broccoli, chard, collard greens, kale, spinach, carrots, pumpkin, squash, and sweet potatoes; juices from these vegetables are also included. This group is subdivided into two categories based on whether any fat was added during cooking. The recipe database was used to determine whether fat was added to vegetables during cooking. If fat was added, the vegetable was placed in the added-fat category. If not, the vegetable was placed in the no-added-fat category.

Other vegetables—added fat; Other vegetables—no added fat: contains vegetables such as beans, beets, cabbage, cauliflower, corn, cassava, eggplant, green peas, lettuce, bell peppers, snow peas, tomatoes, turnip, Brussels sprouts, and juices from these vegetables. This group is subdivided into two categories based on whether any fat was added during cooking. The recipe database was used to determine whether fat was added to the vegetable during cooking. If fat was added, the vegetable was placed in the added-fat category; if no fat was added, the vegetable was placed in the no-added-fat category.

Mixed vegetables—added fat; Mixed vegetables—no added fat: contains mixed vegetable groups and/or vegetables in combination with other foods. Creamed peas and carrots; carrots in tomato sauce; cucumber salad with creamy dressing; mixed vegetables containing corn, lima beans, and peas; batter-dipped fried vegetables; and vegetable casseroles with cheese are examples of foods in this category. This group is subdivided into two categories based on whether any fat was added during cooking. The recipe database was used to determine whether fat was added to the vegetable during cooking. If fat was added, the vegetable was placed in the added-fat category; if no fat was added, the vegetable was placed in the no-added-fat category.

Citrus fruits, melons, berries, and juices: contains citrus fruits such as limes, lemons, grapefruits, oranges, tangelos, and tangerines; melons, such as cantaloupes, honeydews, and watermelons; and berries, such as blackberries, blueberries, cranberries, raspberries, and strawberries. Fruit juices from these fruits are included in this category.

Other noncitrus fruits and juices: contains apples, apricots, bananas, cherries, grapes, papayas, peaches, pears, and plums. Fruit juices made from these fruits are also included in this food category.

Milk Products

Milk and milk-based foods—regular fat: contains all fluid, evaporated, condensed, and dry whole milk (fat content 3 percent or higher by weight) as well as regular yogurt, coffee creams, cream substitutes, whipping creams, sour creams and dips, and neuchatel/cream cheese and dips. After reconstitution, the fat content for dry milk was equivalent to that for whole milk.

Milk and milk-based foods—lower fat: contains all fluid, evaporated, and dry reduced-fat milk (fat content 2 percent by weight), light milk (fat content 0.5 to 1 percent by weight), and skim (fat-free) milk as well as lowfat or nonfat yogurt (fat content less than 1.55 percent by weight). Tofu yogurt was also included in this category. After reconstitution, the fat content for dry milk was equivalent to that for reduced-fat, light, or skim milk.

Cheese: contains natural, processed, and imitation cheeses; cottage cheese; cheese spreads; cheese dips; and cheese soups. These foods were not sub-classified into regular and lowfat categories, because the average amount of cheese reported as being consumed was too low to be separated into two categories and to be used in the mathematical model.

Milk-based drinks and desserts—regular fat; Milk-based drinks and desserts—lower fat: contains milk-based drinks such as flavored milk, malted milk, eggnogs, cocoa, hot chocolate, infant formulas, meal-replacement drinks, soy-based drinks, and milk-based dry mixes; dairy desserts made with ice milk, ice cream, and frozen yogurt; sherbet, puddings, and custard; and frozen tofu desserts. Milk-based drinks with a fat content equivalent to that of whole milk (fat content 3 percent or higher by weight) and dairy desserts having more than 6 percent fat content by weight were placed in the regular-fat category. Milk-based drinks with a fat content equivalent to that of reduced-fat or skim milk (fat content less than 3 percent by weight) and dairy desserts having 6 percent or less fat content by weight were placed in the lower fat category. For dry milk-based drinks, the fat level of whole-milk powder was used as the basis for placing the dry mixes into the regular or lower fat category. Whole-milk powder has a fat content of 26.7 percent; thus, milk-based dry drink mixes having less fat than 26.7 percent were placed in the lower fat category.

Meat/Meat Alternates

Red meats—high fat, regular cost; Red meats—high fat, low cost: contains beef; pork; veal; lamb; game meats; and organ meats such as liver, kidney, brains, tongue, and tripe. Red meats with a fat content of 10 percent or more by weight were considered high fat; this cutoff value was selected because it is used by FDA to define regular fat versus lean meat. To determine regular cost versus low cost, CNPP arranged each food in the category for high-fat red meats (beef, pork, etc.) in descending order by its average cost per pound: The top 66.66 percent of foods were placed in the regular-cost category, and the bottom 33.34 percent of foods were placed in the low-cost category.

Red meats—lean, regular cost; Red meats—lean, low cost: contains beef, pork, veal, lamb, and game meats. Red meats with a fat content of less than 10 percent by weight were included in this group; this cutoff value was selected because it is used by FDA to define regular fat versus lean meat. The standards used for ground beef or hamburger to be considered lean were for these items to have no more than 22.5 percent fat content or to have 25 percent less fat by weight than the reference meat had. The 25-percent cutoff value is based on the FDA definition of regular versus reduced-fat meat. To determine regular cost versus low cost, CNPP arranged each food in the category for lean red meats (beef, pork, etc.) in descending order by its average cost per pound: The top 66.66 percent of foods were placed in the regular-cost category, and the bottom 33.34 percent of foods were placed in the low-cost category.

Poultry and fish—high fat, regular cost; Poultry and fish—high fat, low cost: contains raw and processed chicken, turkey, duck, Cornish game hen, game birds, and organ meats (e.g., liver, giblets, and gizzards), as well as fish and shellfish. Fish and poultry with a fat content of 10 percent or more by weight were included in this group; this cutoff value was selected because it is used by FDA to define regular fat versus lean poultry and fish. To determine regular cost versus low cost, CNPP arranged each food in the category for high-fat poultry and fish (chicken, tuna, etc.) in descending order by its average cost per pound: The top 66.66 percent of foods were placed in the regular-cost category, and the bottom 33.34 percent of foods were placed in the low-cost category.

Poultry and fish—lean, regular cost; Poultry and fish—lean, low cost: contains raw and processed chicken, as well as fish and shellfish, with less than 10 percent fat content by weight; this fat cutoff value was selected because it is used by FDA to define regular fat versus lean poultry and fish. To determine regular cost versus low cost, CNPP arranged each food in the lean poultry and fish category (chicken, tuna, etc.) in descending order by its average cost per pound. The top 66.66 percent of foods were placed in the regular-cost category, and the bottom 33.34 percent of foods were placed in the low-cost category.

Lunch meats, sausages, and bacon—regular fat; Lunch meats, sausages, and bacon—lowfat: contains sausage, bacon, and luncheon meat-type foods, including frankfurters. Foods with the CSFII descriptor “lowfat” or ones that contain 25 percent less fat by weight than their original form were placed in the lowfat category. The 25-percent cutoff value is based on the FDA definition of regular versus reduced-fat meat. For some foods, fat comparisons were not possible, so a cutoff of 20 percent fat content or more by weight was used to classify foods into regular and lowfat products.

Egg and egg mixtures: contains eggs, egg substitutes, eggs with vegetables and/or meat, egg drop soup, and meringues. Foods in this category are not subdivided based on fat content because egg-based products have similar fat contents.

Meat, poultry, and fish mixtures—regular fat; Meat, poultry, and fish mixtures—lowfat: contains beef, veal, pork, lamb, chicken, turkey, and fish with vegetables and/or grain products. This group is subdivided into two categories: regular and lowfat. Mixtures were generally placed in the regular or lowfat category based on their CSFII descriptor. In some cases, a food code was reviewed and then placed in a particular category based on the fat content of its recipe components. Mixtures with a fat content of 8 percent or more by weight were placed in the regular-fat category, and those with a fat content of less than 8 percent by weight were placed in the lowfat category. Eight percent was chosen to avoid placing mixtures containing cream or cheese in the lowfat category. This value was an appropriate cutoff because meat mixtures with vegetables and rice or noodles were placed in the lowfat category. Fried meat mixtures, such as fish cakes and fish and chips, were placed in the regular-fat category.

Dry beans, peas, lentil dishes, and mixtures: contains black, white, lima, pinto, red, mung, and kidney beans; lentils; and different types of peas cooked alone or with other foods. Soybean products (i.e., miso, tofu, and meal) and soybean-based meat substitutes (i.e., textured protein products and soyburger) were also placed in this food category.

Nuts and seeds: contains all ground and tree nuts, such as almonds, cashews, peanuts, coconut, and walnuts; seeds such as sunflower, pumpkin, and sesame; and nut butters.

Other Foods

Fats, oils, salad dressings, sauces, and condiments: contains table fats such as butter, margarine, vegetable oil, and butter blends; fat-free butter replacements; cooking fats such as lard, shortening, corn oil, olive oil, peanut oil, rapeseed oil, safflower oil, soybean oil, and sunflower oil; salad dressings; and condiments, sauces, gravies, and seasonings.

Coffee and tea: contains instant, ground, and fluid coffees and teas with or without caffeine and with or without sugar or sweeteners, as well as postum.

Fruit drinks, soft drinks, and ades—regular calorie; Fruit drinks, soft drinks, and ades—low calorie: contains fruit juice drinks, cola- and pepper-type soft drinks, root beer, ginger ale, cream soda, and lemonade. This group is subdivided into regular- and low-calorie categories. All drinks that are sugar free or are described in the CSFII as low calorie are included in the low-calorie category. Other drinks containing sugar are included in the regular-calorie category.

Sugars and sweets: contains all types of sugars, sweeteners, and syrups such as honey, jams, jellies, marmalades, preserves, icings, gelatin desserts, marshmallow, fudge, all types of candies and chocolates, and chewing gum.



1022503270



For more information, visit the CNPP Website
www.cnpp.usda.gov